Resource Management Plan

Point Reyes National Seashore
National Park Service
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Approved:

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Date

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INTRODUCTION

Point Reyes National Seashore (PORE) is located in Marin County, California, and approximately 40 miles northwest of San Francisco, within the sixth Congressional District. Congress established the Seashore on September 13, 1962 "to save and preserve, for the purpose of public recreation, benefit, and inspiration, a portion of the diminishing seashore of the United States that remains undeveloped (PL 87-657)." This geologically unique peninsula encompasses 71,046 acres of beaches, coastal cliffs and headlands, marine terraces, coastal uplands and forests. Migrating northward along the San Andreas Fault, the Seashore has appropriately been called an "Island in Time."

The enabling legislation and subsequent laws, the Point Reyes National Seashore Act (PL 87-657) and the National Parks and Recreation Act of 1978 (PL 95-625) provided that owners of lands acquired for park establishment may "retain for himself and his/her heirs and assigns, a right of use and occupancy for a definite term of not more than twenty-five years...or a term ending in death...whichever is later." Approximately 18,000 acres of Point Reyes National Seashore have been retained in agricultural production within a "pastoral zone." The Northern District of Golden Gate National Recreation Area (GOGA), which is administered by PORE, contains an additional 10,500 acres that are in beef cattle grazing. State and federal enclaves and commercial activities within the Seashore were excluded from purchase. These inholdings comprise 4,970 acres.

In 1976, Congress established the 27, 090-acre Point Reyes Wilderness (PL 94-544 and PL 94-567) and 6,000 acres as potential wilderness. Located near the San Francisco metropolitan area, this wilderness area is one of the most accessible within the United States wilderness system. In 1985, Congress changed the name of the wilderness area to the Phillip Burton Wilderness (PL 99-68).

Marine and land boundaries are shared with the Gulf of the Farallones National Marine Sanctuary, Golden Gate National Recreation Area, and Tomales Bay State Park. In 1988, UNESCO Man in the Biosphere program designated the Central California Coast Biosphere Reserve (CCCBR) under the International Biosphere Program; CCCBR includes the entire Seashore, the Golden Gate National Recreation Area and other public lands in the region. Additionally, the state of California designated three "Areas of Special Biological Significance" within the Seashore: Tomales Point, Point Reyes Headlands, and Double Point.

PORE supports a unique and varied landscape that has been subject to a broad range of human and natural events. Saved from development by its inclusion within the National Park Service System, Point Reyes is unique not only in its assemblage of natural and cultural features, but also in its proximity to a major urban population. This juxtaposition makes the Seashore's resources and recreational opportunities readily accessible to a large number of people, and enhances the importance of the special qualities for which it was set aside. This diversity, complexity, rarity and proximity to the Bay Area make balancing the National Park Service mandates of use and preservation difficult.

Natural Resources

Geologically the Point Reyes Peninsula is a fragment of the Pacific Plate that has been migrating northwest, separated from the North American Plate by the San Andreas Fault. The peninsula is distinct from the adjacent mainland, with marked differences in geomorphology, hydrology, weather, soils and plant communities. The location of Point Reyes at the midpoint of the Pacific Coast places it at a boundary of two climatic provinces, which results in an abundance and variety of plant life. The peninsula occurs at the northern and southern range extensions of many native plants. Several plants and animals occurring at Point Reyes are endemic, meaning they occur nowhere else. The Seashore is known to support over 876 plant species, including 23 federally listed species (seven of which also are state listed) and an additional 25 that are listed or proposed for listing by the California Native Plant Society (CNPS). Among these are the federally listed Endangered beach layia (*Layia carnosa*), Tidestrom's lupine (*Lupinus tidestromii*), Sonoma alopecurus (*Alopecurus aequalis* var. *sonomensis*) and Sonoma spineflower (*Chorizanthe valida*). The latter species occurs only at Point Reyes.). The Seashore contains 47 listed animals species, 14 of which have federal status as endangered, 8 as threatened and 25 species of concern. Among these are the Endangered brown pelican (*Pelecanus occidentalis*) and Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*); federally threatened species include the northern spotted owl (*Strix occidentalis*), western snowy plover (*Charadrius alexandrinus*), and red-legged frog (*Rana aurora*).

The terrestrial landscape of the Seashore includes sandy beaches, coastal cliffs and seastacks, broad marine terraces and grasslands, coastal uplands of mixed grassland and coastal scrub, mixed hardwood/Douglas-fir forests and stands of the rare Bishop pine (*Pinus muricata*). The fauna inhabiting the Seashore is as varied as the landscape, although a number of native animals have been extirpated through human action such as the California grizzly bear (*Ursus arctos*). Some extirpated species such as the coyote (*Canis latrans*) have returned, and tule elk (*Cervus elaphus nannodes*) and the American peregrine falcon (*Falco peregrinus anatum*) have been reintroduced. Sharing habitats with the native wildlife are an unknown number of exotic ungulates, feral animals including pigs and cats, nonnative predators such as red fox (*Vulpes vulpes*) and approximately 5,000 domestic cattle.

Located along the Pacific Flyway and prominently jutting from the coast, the Point Reyes Peninsula supports a large number of resident and migratory birds. Over 460 species have been documented; of these, greater than 247 are considered rare by the "Field Checklist of Birds for Point Reyes National Seashore (1999)." The Seashore contains the Point Reyes Bird Observatory (PRBO), one of the preeminent avian research institutions in the United States. The marine environment, influenced by the rugged topography of the peninsula drives the climate of Point Reyes, and significantly adds to the abundance and diversity of wildlife. Point Reyes is the center of one of a few coastal upwelling marine ecosystems in the world. Located at the convergence of a number of ocean currents, adjacent waters are rich in nutrients and support an abundant fishery and associated fauna. The Seashore is home to a number of highly significant seabird and pinniped colonies (Sowls et al. 1980, Carter et al. 1993, Allen et al. 1987, 1989, Sydeman

and Allen 1999). Eleven species of seabirds nest at Point Reyes including such species as the rare ashy storm-petrel (*Oceanodroma honochroa*), found only in a few places in the world (Ainley 1995), tufted puffin, (*Fratercula cirrhata*), and common murre (*Uria aalge*). Other marine animals, many of which are listed as Endangered under the Marine Mammal Protection Act (e.g., southern sea otter [*Enhydra lutris nereis*], and Steller sea lion [*Eumetopais jubatus*]), inhabit or transit the waters off of Point Reyes. Twenty percent of California's breeding population of harbor seals (*Phoca vitulina*) occur at Point Reyes Allen et al. 1984). In 1981, northern elephant seals (*Mirounga angustirostris*) colonized the Point Reyes Headlands and the colony has been expanding into areas accessible to the public (Allen et al. 1991). Gray whales are numerous during winter and spring migrations, and humpback (*Megaptera novaeangliae*) and Blue (*Balaenoptera musculus*) whales are frequently observed in summer and fall. Minke whales (*Balaenoptera acutorostrata*) reside in Drake's Bay. Thus, Point Reyes is one of the premier locations along the Pacific Coast for visitors to observe whales and other marine mammals.

The geology of the Seashore and its association with the Pacific Ocean resulted in a number of unique estuarine environments that are some of the most unspoiled in the United States. Tomales Bay, formed by seismic activity along the San Andreas Fault, is a long narrow bay that parallels much of the eastern edge of the Seashore, which largely is legislated wilderness. The environmental health of the Bay is of great concern to the local community, scientific institutions, and public agencies. The bay is important for its mariculture industry and herring fishery, and provides significant recreational opportunities. Harbor seals and sea lions use portions of the Bay, and tens of thousands of migratory waterbirds and shorebirds occur in winter months. The Bay has been a focal point of community and area interest in issues concerning water quality and quantity, anadromous fisheries, agricultural land practices and land development.

Drake's Estero, Estero de Limantour and Abbott's Lagoon also are significant estuarine resources. Drake's Estero has been characterized as possibly the most pristine estuary on the Pacific Coast. It supports one of the highest concentrations of pupping harbor seals within the state of California and is used by numerous avian species including migratory birds, many of which are species with either state or federal status (Sowls et al. 1980, Shuford 1993).

Drake's Estero is the site of one of the largest mariculture operations on the California coast, accounting for 20% of California's commercial oyster production (California Department of Health Services 1993). Conflicts exist between wildlife, recreation, and commercial mariculture. Additionally, the Estero is susceptible to nutrient and other inputs from adjacent ranches and dairies. The State of California operates a monitoring program for water quality and paralytic shellfish poisoning (PSP) as directed by the State Environmental Protection Agency. The San Francisco Regional Water Quality Control Board (SFRWQB) has conducted studies within the Estero to establish a "clean" reference data set for evaluating water quality in San Francisco Bay.

Several marine areas along the Point Reyes coastline have been recognized for their biological significance and receive some protection under state designation. The Point

Reyes Headlands Reserve, Estero de Limantour Reserve and Duxbury Reef Reserve (which is adjacent to the Seashore's southern boundary) are protected under Title 14 of the California Code through a program administered by the California Department of Fish and Game (CDFG). The California State Water Resources Control Board has designated four other areas along the coast –Bird Rock, Point Reyes Headlands, Double Point and Duxbury Reef – as Areas of Special Biological Significance (ASBS).
Due to the interface of the Seashore with the Pacific Ocean and its importance to wildlife, the Seashore coordinates and cooperates with an increasing number of agencies and organizations including the National Marine Fisheries Service (NMFS), U. S. Geological Survey (USGS), Gulf of the Farallones National Marine Sanctuary (GFNMS), Central California Coast Biosphere Reserve (CCCR) members, U.S. Fish and Wildlife Service (FWS), the Audubon Society, California Department of Parks and Recreation, Point Reyes Bird Observatory, Marine Mammal Center (MMC), and CDFG.

Historic sites abound on the Point Reyes peninsula. The Coast Miwok Indians inhabited the area and human population density before European contact was probably greater than it is today (citation needed here). Coast Miwoks still live in the area and participate in annual festivals sponsored by the Seashore and the Miwok Archeological Preserve of Marin (MAPOM). The Coast Miwoks use the cultural exhibit known as Kule Loklo for traditional and ceremonial events. Other groups such as the Federated Coast Miwoks also have taken an interest in activities within the Seashore related to archeological finds. At least 80 known village sites exist, primarily on the lowlands. Point Reyes may contain the site of the first known English/Native American contact North America. According to many experts, Sir Francis Drake may have landed here in June of 1579 to careen his ship before sailing across the Pacific on a circumnavigation of the globe. Since that year, Point Reyes history abounds with accounts of shipwrecks. Later in the 1800s, the peninsula was a favorite landing place for the Spanish and several rancheros were established. The Spanish were followed by a wave of American ranching operations that continue to operate in the Seashore's pastoral zone.

In response to the many shipwrecks associated with the treacherous coastal waters, lighthouse and life-saving stations were established by the United States Government in the late 1800s and early 1900s. The historic Point Reyes Lighthouse was in service from 1870 to 1975. During that time, it endured many hardships, including the 1906 earthquake. Forty-five shipwrecks occurred during the first 60 years of the Lighthouse's operation. Because of this ongoing problem, the U.S. Life-Saving Service established a life-saving station on the Great Beach in 1890. Four years later it was moved to Drakes Bay. The U.S. Coast Guard assumed the operation in 1915 and upgraded it in 1927. The life-saving station was designated a National Historical Landmark in 1989. The Lighthouse was listed on the National Register of Historic Places in 1978.

Cultural Resources

Archaeology: The Seashore is rich in prehistoric and historic archaeological resources. Over 80 historic and prehistoric archaeological sites have been identified on lands managed by the Seashore. Preliminary data from a three-year archaeological overview and assessment currently underway indicates that the number of sites is likely to increase.

The sites represent the prehistoric life and culture of the Coast Miwok, early European coastal explorations, and a continuum of ranching history midden that extends to the present day. Sites are generally in fair condition, although erosion, oyster farming, and cattle ranching operations damaged several middens. Known sites are now protected by fencing and other means, however continued site monitoring is necessary. Vandalism, a problem in the past, will continue to be a threat to resources in the future.

Within Seashore waters are submerged cultural resources in the form of shipwrecks, porcelain, and precious metals from shipwrecks that date back to 1595. The wreck of Sebastian Rodriguez Cermeno's San Agustin in 1595 was the first recorded shipwreck off the California coast. Work by the NPS Submerged Cultural Resources Unit and others, including Sonoma State University, in 1995-98 located anomalies along the coast of Drake's Bay and formed the basis for additional work to be completed in FY2000-2002.

Historic Structures: The List of Classified Structures (LCS) was updated in 1995 and contains 293 structures on lands managed by the Seashore. Several structures are listed on the National Register of Historic Places. These are the Olema Lime Kilns (10-08-76), the Point Reyes Lifeboat Station (11-07-85) which also houses historic 36-foot motor lifeboat No. 36542, and the Pierce Ranch Complex (12-06-85). The Lifeboat Station was also designated a National Historical Landmark on 12-20-89. The Keeper of the National Register has formally determined that both the Point Reyes Lighthouse (03-07-78) and the Sarah Seaver Randall House (08-29-79) are eligible for the national register.
The LCS data shows that although there are far to many structures in fair or poor condition, the park has been somewhat better able to ensure adequate maintenance of structures managed by park staff than those managed by permitees. Of the 293 structures on the LCS, 29% are in good condition and slightly more than half are managed by permitees. Permitee structures are generally historic ranch buildings and landscape features. It should be noted that structures in good condition require only cyclic maintenance, while those in fair or poor condition require much more costly capital improvements ranging from exterior envelope repairs to complete building rehabilitation. The data also shows that the park has been somewhat better at maintaining buildings with national or state significance than it has those of local significance.

The table below summarizes LCS data.

Historic Structure Management & Condition						
Condition	Total		NPS Managed		Permitee Managed	
Good	84	29%	55	43%	29	18%
Fair	174	59%	54	42%	120	73%
Poor	35	12%	19	15%	16	9%
Total	293	100%	128	44%	165	56%

Structures are subject to deterioration caused by both environmental and use-related conditions. The coastal environment is quite harsh and exposes structures to damp, salt air, and high winds. Corrosion is a major problem for all metals, and is especially difficult at the lighthouse, which is cast iron. Ranch buildings are made primarily of wood, with wood structural members, cladding, and roofing, metal fasteners and, more recently, corrugated metal roofing. Structures are often damaged by the high winds that are common on the Point.
The park will be modifying the way it manages permitted structures to ensure a higher level of maintenance. Park staff is developing maintenance guidelines for historic ranch structures and landscapes.

Additional structures have come to the park within the last year because of acquisitions and expirations of Reservations of Use and Occupancy. These include properties that may be eligible for the National Register, including RCA Communications sites at Bolinas and Point Reyes, and a small recreational cabin district at Tocaloma.
Cultural Landscapes: With WASO support, the park began in 1996 a multi-year inventory of cultural landscapes in the park. The park cultural landscapes inventory (CLI), currently in draft form, describes or references the seven cultural landscapes listed below. All but the last two are parent landscapes, within which are component landscapes. For instance, there are 42 component ranch landscapes within the two parent ranch landscapes. Currently, the park is considering proposed boundaries for a Point Reyes Ranches Historic District, and it is likely that a second historic ranch district will be proposed for the Olema Valley.

- Point Reyes Ranches
- Olema Valley Ranches
- RCA Communications Facilities
- Coastal Defense Sites
- Coast Guard Facilities
- The Olema Lime Kilns
- Laird's Landing

The most pressing issue facing the historic ranches is ranchland management for resource values. The park will be developing a management framework and the associated operational details that will enable it to achieve natural and cultural resource management objectives while ensuring that the ranches continue to operate on an economic basis. The objective of this exercise will be to ensure that the park has a clearly defined purpose for issuing permits for ranching within its boundaries and a basis for enforcing the requirements of the permits. Stakeholders in this process are park staff and management, including natural and cultural resources staff and the range specialist, ranchers, and the public.

Collections: The PRNS Scope of Collection Statement (1991) and Collection Management Plan (1998) serve as a guides for the park in the acquisition and preservation of museum objects. There are currently 120,000 objects in the collection, including historic photographs, a herbarium, natural history specimens, pre-historic and historic artifacts, and archival documents. At PRNS there are five locations with museum collections: Bear Valley VC exhibits; the Collection Storage Facility at the Bear Valley VC; Ken Patrick VC exhibits; Lighthouse VC exhibits; and the Lifeboat Station. Additional items are on display at the Morgan Horse and Pierce Point Ranches. Approximately 150 items are currently on display at the different visitor centers throughout the Seashore.

The main body of the collection is kept in the collection storage room in the Bear Valley VC. A new, larger collection storage facility is under construction in the Red Barn and scheduled for completed in FY2001. The new facility will include copious storage space, a curatorial workroom and an office, and will have dedicated environmental control and fire suppression systems.

Point Reyes National Seashore Vision Statement

Point Reyes National Seashore will be a model of environmental stewardship – a coastal sanctuary where all park staff and the public are actively involved in the common goal of maintaining, protecting, restoring, and preserving the natural and cultural integrity of the park.

We will enhance stewardship through research and monitoring programs. We will use this knowledge to promote the natural vitality of a healthy ecosystem, with a resource management

program that supports the native species and natural biologic and geologic processes, which occur here. Threatened, endangered, and specially protected species will be given particular attention to ensure they are perpetuated for future generations.

To acknowledge the historic, cultural, and ethnic diversity of the area, resources such as the Point Reyes Lighthouse and other maritime sites and structures, Coast Miwok sites, and cultural landscapes embodied in the historic ranches will be preserved.

By encouraging community participation, we will gain both assistance and support for the park. Visitors from all sectors of the public will have opportunities to recreate and enjoy this beautiful coastal sanctuary and to become meaningfully involved through resource-based interpretive programs and volunteer opportunities.

Point Reyes will be a place where you can visit and experience nature in peaceful solitude as it has existed for thousands of years. Visitors will be able to view the elk herds grazing the coastal headlands, watch the salmon and steelhead spawning in coastal streams, and walk through towering forests.

To expand awareness of the importance and value of Point Reyes National Seashore and the entire national park system, we will proactively share information with the media and the public. Through partnerships with federal, state, and local agencies, elected representatives, and public and private organizations, our effectiveness as stewards will be heightened.

Quality visitor facilities will be provided. Development will be minimal and have high standards, using appropriate architectural themes. Any rehabilitation of structures or facilities for the public use will attain the highest visual quality possible.

To provide superior park management and operations, a diverse staff, which is technologically up-to-date and meets the highest standards of professionalism will be developed and supported. As stewards of Point Reyes National Seashore, all employees will work cooperatively as a team dedicated to the park's preservation

Exceptional Resources Statement

Point Reyes National Seashore comprises over 71,000 acres, including 33,000 acres of wilderness area. Estuaries, windswept beaches, coastal grasslands, salt marshes, and coniferous forests create a haven of 80 miles of unspoiled and undeveloped coastline. Located just an hour's drive from an urban area populated by seven million people, the park receives over 2.5 million visitors annually. Abundant recreational opportunities include 147 miles of hiking trails, backcountry campgrounds, and numerous beaches.

Geologically, Point Reyes National Seashore is a land in motion. The great San Andreas Fault separates the Point Reyes Peninsula from the rest of the North American continent. Granite bedrock found here matches the bedrock in the Southern Sierra Nevada range This indicates the peninsula has moved over 300 miles northwest over a period of 100 million years.

As wildland habitat is developed elsewhere in California, the relevance of the Point Reyes Peninsula as a protected area with a notably rich biological diversity increases. Over 45% of

North American avian species and nearly 18% of California's plant species are found here due to the variety of habitat and uniqueness of the geology.

Point Reyes contains examples of the world's major ecosystem types. For this reason it was internationally recognized in 1988 by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Man and the Biosphere program and named the Central California Coast Biosphere Reserve.

The cultural history of Point Reyes extends back some 5,000 years to the Coast Miwok Indians who were the first human inhabitants of the peninsula. Over 100 known village sites exist within the park. According to many experts, Sir Francis Drake landed here in 1579, the first European to do so. In response to the many shipwrecks on the treacherous coastal waters, key lighthouse and lifesaving stations were established by the United States government in the late 1800s and early 1900s. In the early 1800s, Mexican land grantees established rancheros. These were followed by a wave of American agricultural operations, which continue to this day in the Seashore's pastoral zone.

LEGISLATIVE MANDATES

National Park Service Specific Legislation

NATIONAL PARK SERVICE ORGANIC ACT (16 U.S.C. 1 ET SEQ. (1988), AUG. 25, 1916)

Established the National Park Service and enumerated the jurisdictional authorities and mission of the Service, specifically:

> *"shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified, except such as are under the jurisdiction of the Secretary of the Army, as provided by law, by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."*

POINT REYES NATIONAL SEASHORE ACT (PL 87-657)

Enacted in September 1962 "…in order to save and preserve, for the purposes of public recreation, benefit, and inspiration, a portion of the diminishing seashore of the United States that remains undeveloped…", the enabling legislation for the Seashore, describes the reason for establishment and the national significance of the resources to be preserves.

GENERAL AUTHORITIES ACT OF 1970 (16 U.S.C. LA-1--LA-8 (1988))

The General Authorities Act clarified the authorities of the National Park Service and provided for the inclusion of new types of park areas not specifically enumerated, or envisioned, at the time of the passage of the Organic Act. Most importantly, this act unified the preservation

mandate of the NPS, and applied it to all the areas within the National Park System. The Act specifically stated;

> *Areas of the National Park System, the act states, "though distinct in character, are united through their inter-related purposes and resources into one national park system as cumulative expressions of a single national heritage; that, individually and collectively, these areas derive increased national dignity and recognition of their superb environmental quality through their inclusion jointly with each other in one national park system preserved and managed for the benefit and inspiration of all the people of the United States...."*

REDWOOD NATIONAL PARK ACT (16 U.S.C. 79A-79Q (1988))

Specifically intended to add land and enhance protection for Redwood National Park, this act also amended the General Authorities Act of 1970 and reaffirmed the Park Service Mission and the highest level of preservation for all units of the system.

> *"Congress further reaffirms, declares, and directs that the promotion and regulation of the various areas of the National Park System...shall be consistent with and founded in the purpose established by the first section of the Act of August 25, 1916, to the common benefit of all the people of the United States. The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."*

Other Preservation and Conservation Legislation

ANTIQUITIES ACT OF 1906 (16 U.S.C. 431-433 (1988))

Predating the establishment of the National Park Service, the Antiquities Act was the first federal legislation establishing a specific policy for the preservation of historic, prehistoric and archeological resources. This act also provided the authority for the establishment of national monuments.

ARCHEOLOGICAL RESOURCES PROTECTION ACT OF 1979 (16 U.S.C. 470AA (1988))

The Archaeological Resources Protection Act (ARPA) enhanced the protections established by the Antiquities Act. It not only increased enforcement authority for the preservation of archeological resources, but also provided for civil penalties and enhanced cooperation between government and non-government entities for archeological resource protection and preservation.

NATIONAL HISTORIC PRESERVATION ACT OF 1966 (16 U.S.C. 470 ET SEQ. (1966))

The National Historic Preservation Act (NHPA) further elevated the importance of preserving historic properties within the National Park Service, mandated cooperation with state preservation authorities, and expanded inclusion of properties within the National Register of

Historic Places. Section 106 of the act required federal agencies to consider the effects of their actions upon historic resources.

Point Reyes National Seashore contains 293 structures on the List of Classified Structures

WILDERNESS ACT OF 1964 (16 U.S.C. 1131 ET SEQ. (1988))

The Wilderness Act established the National Wilderness Preservation System, composed of federal lands designated as Wilderness Areas. Wilderness Areas are to be administered "...for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, so as to provide for the...preservation of their wilderness character...." Point Reyes National Seashore contains 35,370 acres of wilderness in the Phillip Burton Wilderness preserving a critical remaining pristine portion of the California Coast.

CLEAN AIR ACT (42 U.S.C. 7401-7671Q)

The Clean Air Act provides a legal framework for the National Park Service to preserve and protect parks' air quality related values (AQRVs) from pollution sources emanating from within and outside park boundaries. Class I park areas, those containing legislated wilderness, are to be provided the highest level of protection to prevent significant deterioration (PSD) of air quality related values. By virtue of the Phillip Burton wilderness, Point Reyes National Seashore is a Class 1 Air Quality Area and is to be managed to protect and preserve clean air values.

CLEAN WATER ACT (33 U.S.C. 1251-1376 (1988))

The Clean Water Act was enacted to..." restore and maintain the chemical, physical, and biological integrity of the Nation's waters" by attaining the goals of providing for the protection of fish, shellfish, wildlife, and recreation by 1983; eliminating the discharge of pollutants into navigable waters by 1985; and prohibiting the discharge of pollutants to the waters of the United States. (33 U.S.C. 1251

The Clean Water Act, like the Clean Air Act, is delegated to the individual states, with the National Park Service required to comply with state implementation. Any park activity affecting the manipulation of, or discharge of materials into, the waters of the United States must comply with all provisions of the Clean Water Act and be permitted by the appropriate regulatory agency.

NATIONAL ENVIRONMENTAL POLICY ACT (42 U.S.C. 4321 ET SEQ. (1988))

The National Environmental Policy Act (NEPA) declared a national environmental policy, created a formal, legal process for integrating environmental values into federal decision-making, and provided an umbrella under which compliance with several environmental laws can be integrated.

NEPA requires that the federal government wil1 "use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic and other requirements of present and

future generations of Americans." It requires the federal government to consider the consequences of its actions, and provide an analysis of the impact of those actions upon the human environment.

Natural and cultural resource management actions are considered within the context of NEPA, and other environmental laws, with alternative actions evaluated and the impacts of decisions enumerated and/or mitigated.

ENDANGERED SPECIES ACT OF 1973 (16 U.S.C. 1531 ET SEQ. (1988))

The Endangered Species Act (ESA) is comprehensive legislation aimed at preventing the accelerated loss of biological species and their diversity. The ESA provides protection take, harassment and harm for plants and animals classified "endangered or "threatened". Provisions of the law are administered and enforced by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.

National parks, as protected areas, are reserves for large numbers of rare plants and animals protected by the ESA. National Park policies require that these species are monitored to provide a high level of protection, and that management actions are fully evaluated in terms of their potential impact to threatened, endangered and rare species.

Federal actions that may affect listed species require consultation with the administering agencies (USFWS or NMFS) to determine impacts and the development of programs to protect those species. Generally this requires a Biological Opinion and a plan to mitigate any impacts. Point Reyes National Seashore contains twenty-three species formally listed under the Endangered Species Act. Because of the large number of species affected, the Seashore has entered into negotiations with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to develop programmatic agreements specifying what actions involving routine administration of the national seashore may be undertaken without formal consultation. These agreements will allow both the Seashore, and the administering agencies, to be more responsive to the preservation needs of species and more efficient with the use of scarce resources directed toward those efforts.

MARINE MAMMAL PROTECTION ACT OF 1972 (MMPA; P.L. 92-522 as amended by P.L. 93-205, 94-265, 95-136, and 97-58)
The Marine Mammal Protection Act of 1972 and reauthorized on April 30, 1994 (P.L. 103-238) supplements ESA, providing special protection for all marine mammals of the Seashore. MMPA states that it is unlawful to "harass, hunt, capture or kill, or attempt to harass, hunt, capture or kill". The law places much emphasis on protecting species and population stocks in danger of extinction or depletion above a level (to be determined) at which they cease to be a significant functioning element of the ecosystem. Particular emphasis was placed on protecting rookeries, mating grounds and areas of similar significance. In 1994, the National Marine Fisheries Service proposed guidelines on distances of approach to marine mammals so that their behavior would not be altered (Fed. Reg. vol. 57:149, pp. 34121-22); however, these regulations and guidelines were never finalized.

STRATEGIC GOALS

The General Management Plan (1980) and Statement for Management (1990) for Point Reyes identify objectives for the management of natural and cultural resources. The primary objective calls for identification, protection and perpetuation of significant cultural and historic resources and of the diversity of natural ecosystems representative of the California seacoast. The major objectives have been further refined to stipulate the following:

Natural Resources

- To protect marine mammals threatened and endangered species and other sensitive natural resources found within the seashore.

- To enhance knowledge and expertise of ecosystem management through research and experimental programs relating to wildlife, prescribed burning techniques, non-native plant and animal reduction, regulation and control of resource use, restoration of native ecosystems and pollution control.

- To preserve and manage as wilderness those lands so designated under Public Law 94-567 and to also manage as wilderness to the extent possible those tidelands and lands legislatively designated as potential wilderness.

- To retain Research Natural Area status for the Estero de Limantour and the Point Reyes Headlands reserves and propose other suitable sites if found highly desirable for research and necessary for resource protection.

- To manage seashore activities in the pastoral and estuarine areas in a manner compatible with resource carrying capacity.

- To monitor grazing and improve range management practices in the pastoral zone in cooperation with the ranchers and the Natural Resources Conservation Service.

- To monitor and improve maricultural operations, in particular the oyster farm operation in Drakes Estero, in cooperation with the California Department of Fish and Game.

- To monitor activities occurring on nonfederal properties within the National Seashore owned by Radio Corporation of America, American Telephone and Telegraph Company, and the Vedanta Society, to ensure that land uses are in agreement with the legislative acquisition exemption.

Cultural Resources

- To identify features and events that have played a vital part in the recorded history of Point Reyes, such as earthquakes, shipwrecks, land and water uses, the voyage of Sir Francis Drake, and the United States Coast Guard Lighthouse and Lifesaving Station.

- To enhance knowledge of the Coast Miwok Indian culture through research and conservation management of the numerous archeological sites located at Point Reyes.

- To preserve and protect all structures, sites and landscapes on or nominated to the National Register of Historic Places and to stabilize and protect other structures and sites pending their historical evaluation.

- To monitor and support productive land uses and activities that are consistent with historic patterns.

- To ensure that agricultural and maricultural activities are consistent with the historical evolution of land and water uses at Point Reyes.

The passage by Congress of the Government Performance Results Act of 1993 (GPRA), mandated that the National Park Service, and all government agencies, define measurable management goals and tie public funding expenditures to the achievement of those goals and objectives. National Park Service GPRA goals are hierarchical and relate primarily to natural and cultural resource protection, visitor satisfaction and organizational effectiveness. These main goals contain subsidiary "Mission Goals and specific long-term goals. Park-specific objectives are incorporated within long-term goals and form performance targets for the creation of five-year and annual performance plans. Annual plans for the current fiscal year are contained within Appendix 8. Overall National Park Service goals include the following:

CATEGORY I: PRESERVE PARK RESOURCES

CATEGORY II: PROVIDE FOR THE PUBLIC ENJOYMENT AND VISITOR EXPERIENCES OF PARKS

CATEGORY III: STRENGHTEN AND PRESERVE NATURAL AND CULTURAL RESOURCES AND ENHANCE RECREATIONAL OPPORTUNITIES MANAGED BY PARTNERS

CATEGORY IV: ENSURE ORGANIZATIONAL EFFECTIVENESS

Primarily related to natural and cultural resource management within Goal I, Preserve Park Resources are the following Mission Goals:

Mission Goal Ia: *Natural and cultural resources and associated values are protected, restored and maintained in good condition and managed within their broader ecosystem and cultural context*

Mission Goal Ib: *The National Park Service contributes to knowledge about natural and cultural resources and associated values; management decisions about resources and visitors are based on adequate scholarly and scientific information.*

The long-term goals contained within Mission Goal Ia form the basis for performance plans with measurement of success based upon a reference, or baseline, condition.

Ia0 Natural and cultural resources and associated values of Point Reyes National Seashore are protected, restored, and maintained in good condition and managed within their broader ecosystem or cultural context.

Ia01a Threatened and Endangered Species - 25% of the 1997 identified park populations of federally listed threatened and endangered species have stable

populations. Applies only to T&E species for which there is NO designated critical habitat in the Park, or NO recovery plans assigned to the NPS.

Ia01b Disturbed lands /Exotic Species-- 10% of targeted disturbed lands, as of 1997, are restored, and 8.5% of priority disturbances are contained

Ia1A 5% of targeted disturbed park lands, as of 1997, are restored, and 5% of priority targeted disturbances are contained. (

Ia2b Threatened and Endangered Species - 25% of the 1997 identified park populations of federally listed threatened and endangered species with critical habitat on park lands or requiring NPS recovery actions have stable populations.

Ia2d Threatened and Endangered Species - Record the number of species that are unknown.

Ia3 Air quality particulate matter monitored under contract as part of the IMPROVE network.

RESOURCE STATUS AND ISSUES

INVENTORY AND MONITORING

The National Park Service's Inventory and Monitoring Program identified a listing of candidate elements and processes for initial inventory in all natural resource parks, proposed the establishment of prototype inventory and monitoring parks, and outlined overall implementation guidelines to be carried out at the national level. The NPS Service-wide I&M Program also recommended that it be NPS policy to "assemble baseline data.... and to monitor those resources forever -- to detect or predict changes that may require intervention, and to serve as reference points for more altered parts of the environment." The statement was adopted, with modifications, in the 1988 NPS Management policies.

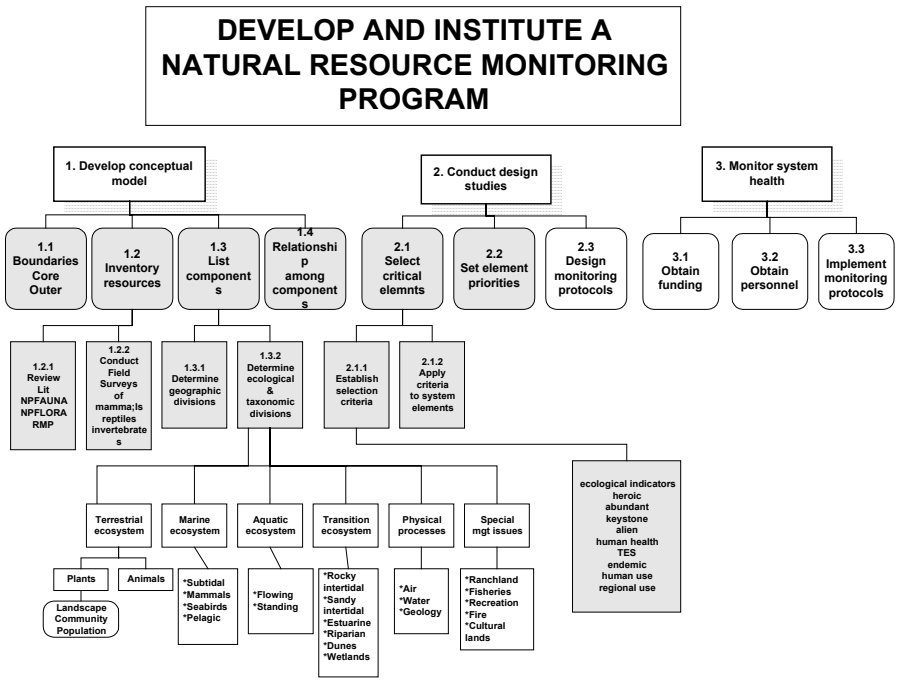
Coastal National Parks of central California, including Golden Gate National Recreation Area (GOGA) Point Reyes National Seashore (PORE), Muir Woods National Monument (MUWO), the Presidio (PRES), and Fort Point (FOPO) chose in 1993 to develop and integrate one I&M plan rather than creating a separate plan for each park. The parks border, or are woven together, comprising over 150,000 acres of land, @30,000 acres of surface waters, and nearly 100 linear miles of shoreline. Since the parks share borders and also ecosystems and associated threats, writing an integrated plan seemed prudent in the employment of personnel, funds, and partnerships.

The development of such a plan required many stages during which time the parks coordinated efforts to identify and complete several of the design elements of an I&M plan as delineated by G. Davis at the Channel Islands National Park (CHIS; Davis 1993). CHIS, a prototype park under the National I&M program, provides a guide and structure upon which the central California NPS parks can build upon because 1) they have similar ecosystems and associated species and 2) the CHIS program has been in place for several years and consequently has had an opportunity to test and refine monitoring protocols.

The park staff conducted several meetings to:

1) develop a mission statement,
2) delineate the boundary limits of the area,
3) develop a conceptual model for advancing a comprehensive and integrated I&M plan,
4) list and evaluate the existing natural resource inventory and monitoring programs,
5) define the ecosystem components and select criteria for ranking ecosystem elements, and
6) solicit input from outside organizations, universities, and other state and federal agencies.

The flow charts depicting the steps needed to develop an I&M Program and a conceptual model of the Seashore are presented in Figure 6.


DEVELOP AND INSTITUTE A NATURAL RESOURCE MONITORING PROGRAM
1. Develop conceptual model
2. Conduct design studies
3. Monitor system health
1.1 Boundaries Core Outer
1.2 Inventory resources
1.3 List components
1.4 Relationship among components
2.1 Select critical elemnts
2.2 Set element priorities
2.3 Design monitoring protocols
3.1 Obtain funding
3.2 Obtain personnel
3.3 Implement monitoring protocols
1.2.1 Review Lit NPFAUNA NPFLORA RMP
1.2.2 Conduct Field Surveys of mamma;ls reptiles invertebrates
1.3.1 Determine geographic divisions
1.3.2 Determine ecological & taxonomic divisions
2.1.1 Establish selection criteria
2.1.2 Apply criteria to system elements
ecological indicators heroic abundant keystone alien human health TES endemic human use regional use
Terrestrial ecosystem
Marine ecosystem
Aquatic ecosystem
Transition ecosystem
Physical processes
Special mgt issues
Plants
Animals
Landscape Community Population
*Subtidal *Mammals *Seabirds *Pelagic
*Flowing *Standing
*Rocky intertidal *Sandy intertidal *Estuarine *Riparian *Dunes *Wetlands
*Air *Water *Geology
*Ranchland *Fisheries *Recreation *Fire *Cultural lands

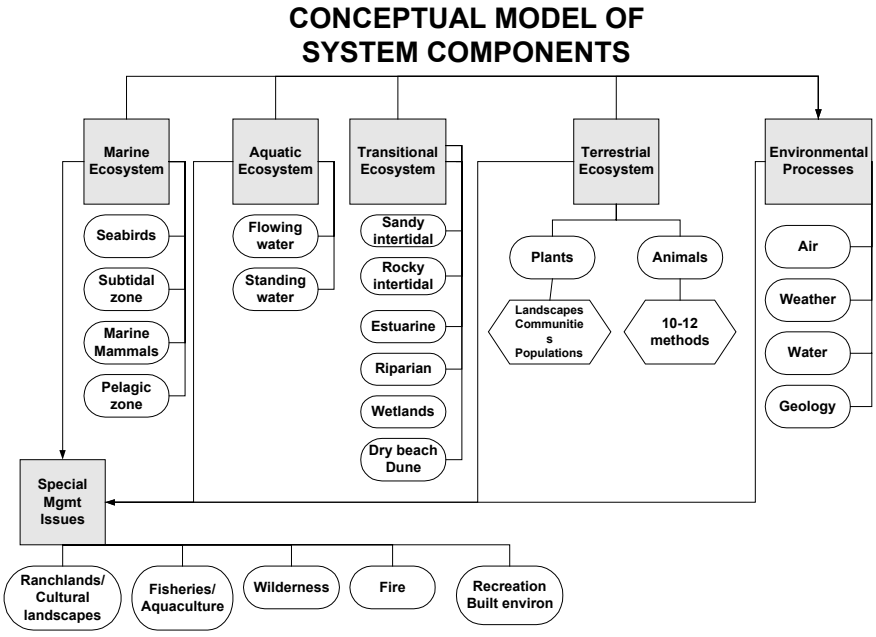

CONCEPTUAL MODEL OF SYSTEM COMPONENTS
Marine Ecosystem
Aquatic Ecosystem
Transitional Ecosystem
Terrestrial Ecosystem
Environmental Processes
Seabirds
Subtidal zone
Marine Mammals
Pelagic zone
Flowing water
Standing water
Sandy intertidal
Rocky intertidal
Estuarine
Riparian
Wetlands
Dry beach Dune
Plants
Animals
Landscapes Communities Populations
10-12 methods
Air
Weather
Water
Geology
Special Mgmt Issues
Ranchlands/ Cultural landscapes
Fisheries/ Aquaculture
Wilderness
Fire
Recreation Built environ

Figure 6.

Vital Signs Mission Statement:

Develop and institute a natural resources monitoring program, which will

1. determine present and future ecosystem health
2. establish empirical limits of resource variation
3. provide early diagnosis of abnormal condition
4. identify potential agents of anthropogenic change

Conceptual Model:

Development of the conceptual model for the I&M plan required several steps (Figure 6). A conceptual model must take into account 1) different scales of time and space and 2) many levels within a region from landscapes, communities to populations. Point Reyes selected population dynamics for evaluating ecosystem condition because 1) the measures are simple, 2) chronic ecosystem stresses are reflected in species' growth rates, 3) species' condition directly reflect ecological condition and function, and 4) population dynamics can be projected into the future through mathematical models. For these reasons, the Seashore included population dynamics to monitor ecosystem vital signs.

To determine what resources to monitor, a preliminary inventory of resources was assembled based on existing park databases, the park Resource Management Plans and output from NPFAUNA and NPFLORA databases developed for the National I&M Program. From these lists NPS staff classified mutually exclusive components into biotic, abiotic and sociological and management categories. Many of the species identified have already been, or are being, inventoried and monitored at the parks both by NPS staff and by outside organizations or agencies (Table 1). Data on existing monitoring projects, therefore, were also compiled.

The NPS staff then identified relationships among system components, which would serve as the ecological conceptual model. Seven system components were distinguished including terrestrial ecosystems, marine ecosystems, aquatic ecosystems, transition ecosystems, environmental processes, sociological, and special management issues. These seven system components will serve as the foundation for the inventory and monitoring plan. Within each of these system components, NPS staff and outside biologists identified sub-components and selected elements to monitor.

Elements to Monitor:

The park staff initiated steps to conduct design studies by selecting critical elements within each ecosystem to inventory and monitor. Since it is not possible to monitor all significant elements within a system component, criteria were devised to assist in the selection process. The criteria for ranking elements in priority order were based on seven points: significance, severity of threats, feasibility, present knowledge, partnerships, transference and cost.
(See also draft Inventory and Monitoring Plan.)
Several project statements address the specific needs for developing an inventory and monitoring program for the park (not in priority order):

Project N-32 Develop a resource baseline inventory

Project N-28 Compile resource management database
Project N-24 Study Mt. Beaver distribution and ecology
Project N-9.02 Refine vegetation map
Project N-38 Monitor northern spotted owls
Project N-40.1 Monitor northern elephant seals
Project N-46 Exotic predators
Project N-50 Inventory and assessment of bats
Project N-51 Conduct inventory and assessment of amphibians
Project N-53 Survey and ecological study of rare animals
Project N-52 Inventory and ecological study of invertebrates
Project N-55 Map existing, historic and potential veg. communities
Project N-56 Conduct survey of terrestrial mammals
Project N-59 Map wetlands
Project N-63 Intertidal, baseline
Project N-63.1 Intertidal monitoring
Project N-65 Monitoring of water quality status and trends
Project N-64 Monitor snowy plovers
Project N-78 Develop marine bird monitoring protocol
Project N-80 Develop subtidal resource monitoring protocol
Project N-77 Develop pelagic resource monitoring protocol
Project N-79 Develop marine mammal monitoring protocol
Project N-94 Inventory and monitor sandy intertidal zone
Project N-96 White shark attendance at Point Reyes
Project N-84.1 Inventory and monitor TES plants
Project N-84.5 Inventory and monitoring of algae/fungi/lichens
Project N-84.6 Inventory and monitoring of TES animals
Project N-84.7 Inventory and monitoring of marine ecosystem
Project N-19 Monitor air quality
Project I-1 Develop a vegetation map – satellite imagery

Table 1. Status of Basic Natural Resource Inventories

THEME	STATUS
Historical Database	Preliminary development of a meta-database to assemble historical data has been initiated under the Information Management Plan
Natural Resource Bibliography	Natural Resource Bibliography created in ProCite software in 1998
Air Quality	Baseline Criteria gases and visibility monitored 1987-92. Particulate PM-10 monitoring ongoing.

Climate	Climate data summarized 1965 through 1988. Climate data 1984 through present digitally stored. Meteorological monitoring automated since 1996
Base Cartography	Current cartography exist for the entire Seashore
Vegetation Map	A draft digital vegetation map covering PORE, GOGA, and the surrounding wildlands, delineating 91 vegetation classes at a 0.5 Ha minimum mapping unit has been delivered. The accuracy assessment will be completed by the end of FY2000 pending availability of funds.
Soils Inventory / Map	A digital soils map based on a 1979 survey is complete.
Geologic Map	A digital geologic map published in 1997 exists for the entire seashore.
Geologic Features	
Disturbed Lands	Preliminary inventory of abandoned mineral lands
Water Quality	Water quality monitoring pilot program initiated 1998
Water Bodies	A digital map of water bodies exists and a wetland inventory has been funded by WRD for FY00.
Species Inventories:	
Amphibians/Reptiles	Partial inventory of amphibians and reptiles conducted by USGS-BRD
Birds	Nearly complete avian inventory, excluding cavity-nesting seabirds, funded by I&M avian initiative 1998-2000, accounting for 90% of the species present.
Fish	Freshwater fish inventory completed 1984
Mammals	Partial inventory of mammals conducted by BRD
Plants (vascular)	Seashore plant species list includes 80-90% of plant species present

SCIENCE COORDINATION

The Science Coordination Division will provide direction and coordination for the development of bioregional research programs that identify, prioritize and integrate park-specific research needs with those of other parks and agencies. Interdisciplinary research is needed to identify existing resource conditions, develop complex monitoring protocols, to detect abnormal changes that require management intervention and to identify potential agents of change. Shared land jurisdictions within these ecosystems require the park to seek cooperative programs with many federal, state and county agencies.

Science coordination may include logistical assistance to those conducting research in the park. This may involve providing access to the Learning Center within the park which will include housing and laboratory facilities. The Learning Center will provide opportunities to use parks as laboratories and libraries for research and learning about *all* park resources.
Research Concerns (not in priority order):

Ecosystem inventory and development of monitoring protocols (see also I&M section)

a. Vegetation mapping
b. Hydrologic mapping and processes, including water quality and quantity
c. Air quality analysis
d. Inventory and monitor TES species
e. Marine - subtidal, pelagic, and supra-tidal ecosystems

Restoration Ecology

a. Watershed restoration - modeling to identify trends and assess vital signs of ecosystems
b. Coastal dune restoration – develop methods for restoration and monitoring protocols for assessing success of restoration techniques
c. Wetland restoration – develop methods for restoration and monitoring protocols for assessing success of restoration techniques
d. Develop methods and monitoring protocols for threatened and endangered plant and animal reintroductions
e. Develop methods for restoring grazed lands and protocols for assessing success
f. Assess interactions of the physical, chemical and biological processes
g. Assess the efficacy of marine refugia

Rangeland and riparian systems

a. Study effects of increased fire occurrence and weed invasion on native plants
b. Study effects of removal of cattle on non-native, native and rare plant communities
c. Study water quality in relation to rangeland use and model erosion in watersheds

Fire

a. Determine fire history of the Seashore
b. Study effects of fire on abiotic and biotic resources
c. Study methods for controlling nonnative plants using prescribed fire
d. Study methods for restoring native grasslands using prescribed fire

Declining species and species at risk

a. Reproductive success and habitat associations of northern spotted owls
b. Map distribution and habitat associations of rare plant species
c. Develop methods for restoring western snowy plovers to beaches where they are now absent (e.g. dune restoration, predator aversion techniques, survivorship)
d. Document status and trends of species that are declining or whose status is unknown (e.g. population surveys, population viability)
e. Assess impacts of invasive species on select rare species (e.g. Sonoma spine flower, neotropical migratory birds, amphibians, estuarine invertebrates, pollinators)

Impacts of invasive aquatic and terrestrial species

a. Studies of prevention, control and invasion dynamics
b. Studies of invasive species ecology and phenology etc. and develop control methods

Several project statements address the specific needs for developing the science coordination program (see also the I&M, Native Plant Revegetation and Native Wildlife Management sections):

Project N-34 Administer scientific research program

Table 2 Cultural Resource Documentation Checklist

Point Reyes National Seashore

TITLE	CURRENT AND APPROVED	NEEDS REVISION	NEEDED
PLANNING DOCUMENTS			
Preauthorization and Authorization	NA		
Statement for Management (SFM)	X		
Outline for Planning Requirements (OPR)	X		
General Management Plan (GMP)	X		
Development Concept Plan (DCP)	X		
Resource Management Plan (RMP)	X		
Interpretive Prospectus (IP)	X		
SERVICEWIDE INVENTORIES, LISTS, CATALOGS AND REGISTERS			
Cultural Resources Bibliography (CRBIB)	X		
Cultural Sites Inventory (CSI)		X	
List of Classified Structures (LCS)	X		
National Catalog of Museum Objects	X		
National Register of Historic Places		X	
BASIC CULTURAL RESOURCE DOCUMENTS			
Archeological Overview and Assessment		X	
Archeological Identification Studies		X	
Archeological Evaluation Studies			X
Ethnographic Overview and Assessment			X
Ethnographic Oral Histories and Life Histories			X
Ethnographic Program			X
Historic Base map		X	
Historic Resources Study (HRS)	X		
Park Administrative History			X
Scope of Collection Statement (SOCS)	X		
SPECIAL RESOURCE STUDIES & PLANS			

Archeo. & Ethno. Collections Studies			X
Archeological Data Recovery Studies			X
Collection Management Plan	X		
Collection Storage Plan		X	
Collection Condition Survey	NA		
Cultural Landscape Report (CLR)			X
Ethnohistory			X
Exhibit Plan			X
Historic Furnishings Report			X
Historic Structures Preservation Guide (HSPG)			X
Historic Structures Report	X		
Social Impact Study	NA		
Special History Study	NA		
Traditional Use Study	NA		

Cultural Context/Theme

In the thematic analysis, History and Prehistory in the National Park System and the National Historic Landmarks Program (1987), Point Reyes National Seashore represents the following:

I. CULTURAL DEVELOPMENTS: INDIGENOUS AMERICAN POPULATIONS

A. The Earliest Inhabitants
1. Early Peopling of the Pacific
2. Western Archeological Adaptations (California Area)

B. Post-Archaic and Pre-Contact Developments
1. Hunters and Gatherers of Western Littoral and Sierra Regions (California).

C. Prehistoric Archeology: Topical Facets
1. Archeology and Shelter
2. Prehistoric Technology
3. Prehistoric Social and Political Organizations
5. Prehistoric Arts/Handicrafts
8. Prehistoric Economics/Trade
10. Prehistoric Religion, Ideology and Ceremonial
11. Prehistoric Social Differentiation
12. Prehistoric Settlements and Settlement Patterns
18. Prehistoric Demographics
19. Prehistoric Cultural Change
21. Major Contributions to the Development of Culture History
22. Major Contributions to the Development of the Science of Archeology
23. Paleoecology
24. Prehistoric Human Physical Remains

D. Ethnohistory of Indigenous American Populations

1. Varieties of Early Conflict, Conquest, or Accommodations
b. Forced and Voluntary Population Movements
c. The New Demographics
1. Disease and Massacres Their Cultural and Biological Effects
2. Depopulation of Terrain

2. The Myth of the Vanishing Native
a. Ethnic Revitalization

II. European Colonial Exploration and Settlement

A. Spanish Exploration and Settlement
1. California
2. Pacific

C. English Exploration and Settlement
1. Exploration

D. Other European Exploration and Settlement

1. Russian

VIII. World War II

D. The Homefront

X. Westward Expansion of the British Colony and the U.S., 1863-1898

F. The Farmers Frontier
   3. Later Settlements and Farming in the California Valley, Oregon and Washington

G. The Cattlemen's Empire
   3. Ranches

XI. Agriculture

XII. Business

A. Extractive or Mining Industries
   4. Timber and Lumber
   5. Fishing and Livestock

B. Manufacturer Organizations
   1. Food, Beverage and Tobacco

XIV. Transportation

B. Ships, Boats, Lighthouses and Other Structures
D. Overland Travel West of the Mississippi, After 1840
E. Railroads
G. Automobiles, Buses, Wagons and Highways

XV. Communication

C. Telegraph and Telephone
D. Radio
F. Post World War II Electronic

XVI. Architecture

Q. Bungalow (1890 - 1940)
V. Historic Districts (Multiple Style and Dates)
X. Vernacular Architecture

XXX. American Ways of Life

B. Farming Communities
E. Ethnic Communities

XXXII. Conservation of Natural Resources

Table 3 Natural Resource Management Assessment Program Analysis, 1997

Natural Resource Program Area	Current Park Staffing (FTE)	Workload (FTE)	Difference (FTE)	Difference % Staffed
Vegetation Management	1.9	7.9	6	0.24%
Wildlife Management	4.0	8.8	4.8	0.45%
Information Management	1.0	2.0	1.0	50%
Inventory and Monitoring	0.0	2.0	2.0	0.00%
Prescribed Fire management	0.8	0.8	0.0	1.00%
Water Quality Management	0.2	3.4	3.2	0.06%
Air Quality Management	0.1	1.1	1.0	0.09%
Geologic Management	0.0	0.7	0.7	0.00%
Paleontological Management	0.0	0.8	0.8	0.00%
Grazing Management	0.6	2.1	1.5	0.29%
Fence Maintenance	0.0	0.3	0.3	0.00%
Disturbed Land Rehabilitation	0.0	6.0	6.0	0.00%
Pest and Hazard Management	0.1	1.9	1.8	0.05%
Environmental Planning and Compliance	0.2	2.0	1.8	0.10%
Science Oversight	1.0	1.0	0.0	1.00%
Interpretation of Natural Resource Issues	0.0	2.0	2.0	0.00%
Total	***10.6***	***38.1***	***31.2***	***27.8%***

Overview of Current Program and Needs

Point Reyes National Seashore occurs in a rich and diverse area and supports a variety of unique natural and cultural resources. Assembled from private lands, the Seashore has the dual task of preserving and restoring the unique ecosystems for which it was set aside, and for fostering the cultural activities, including ranching, which have had adverse impacts on those resources. The Seashore also supports a rich representation of cultural resources associated with the Coast Miwok Indians, the first documented inhabitants of this land. The Coast Miwok were later displaced by early European explorers, Mexican rancheros and dairy ranchers. More recently, navigation operations, maritime commerce, early industries, World War II military activities and varied recreational uses have added to the Seashore's cultural diversity.

A number of significant structures exist throughout the Seashore, many of which are on the National Register of Historic Places or have been determined eligible by the Keeper. These structures have been evaluated for LCS affiliation and National Register Nomination purposes. The Pierce Ranch Complex has had emergency stabilization completed on most of the structures since 1979 to prevent further collapse and deterioration. This work was required to ensure long-term preservation..

Since 1989, several important documents have been researched and completed which aid in the preservation and long-term planning of several historic structures. These documents are: 1) *Hamlet: A History of Jensen's Oyster Beds*, 1989; 2) *The History and Architecture of the Point Reyes Light Station*, 1990; 3) *The History and Architecture of the Point Reyes Lifeboat Station*, 1991; and 4) *A History of the Dairy and Beef Ranches Within the Point Reyes National Seashore, 1834- 1992*, 1992 and 5) *Ranches of the Olema Valley and Lagunitas Creek Area*, 1992.

These documents are tools for management to provide for future policy making decisions. They also begin to pave the way for documentation needs to the National Register. National Register nomination forms are being completed by a team from the Western Regional Office.

Cultural resources in the Olema Valley that are within the boundaries of GOGA are administered by PORE. Therefore, the responsibility of LCS documentation and National Register nomination, as well as for the protection, maintenance and interpretation of the resources will continue to remain with PORE. The Interpretive Prospectus for Golden Gate NRA, Northern District, 1989, as well as the several HRS documents that exist will help guide decisions on long-term planning for cultural resources. Continuing cooperation between the two parks in matters regarding these resources is essential to ensure they are well managed.

The Seashore has a significant and valuable museum collection, some artifacts of which are on display at the Bear Valley, Ken Patrick and Lighthouse Visitor Centers. These artifacts interpret themes from the Coast Miwok Indians to the maritime history of both the lighthouse and life-saving stations. Exhibits are secured using the most up-to-date museum security methods available. Security measures at both the museum collection room and the various visitor centers will be an ongoing issue (PORE C-17 and PORE-C-22). A Collection Management Plan is required for the over 15,000 items currently stored in the museum (PORE C-23).

Historical research could greatly contribute to the overall conceptual management and long-term goals for PORE's cultural resources. An administrative history (PORE C-24) needs to be written, which would reveal information about PORE's formation, development, growth and operation over time.

Natural Resources

Historic land use has significantly altered the landscape at the Seashore, including the plant communities and the wildlife dependent upon them. Much of the Point Reyes Peninsula has been logged or cleared for agriculture. Beginning in the mid-nineteenth century and continuing into the present, activities such as clearing, timbering, cultivation, cropping, road building, commercial development and livestock grazing have markedly altered the environment. Though still rural and relatively undeveloped, the ecosystems represented within the Seashore are far from pristine.

Decades of agricultural use have significantly altered native grasslands, coastal scrub, and some forested areas. Road building and land use have destabilized uplands and disturbed most watersheds to some degree in the Seashore. Many streams no longer support anadromous fisheries due to dam building, siltation and loss of riparian habitat. Habitat type conversions and tilling have facilitated the invasion of numerous nonnative plant species, which in some cases have, or threaten to completely change ecosystems. Nonnative plant invasions affect habitats of numerous endangered, threatened or rare plants and wildlife at the Seashore.

A key issue that continues to affect both terrestrial and aquatic resources is the enabling legislation mandate to continue agricultural activities within the Seashore. Since the Seashore's establishment in 1972, some natural resource conditions have improved while others have deteriorated. The implementation of a Range Management and Monitoring program in 1987 has contributed significantly to effective administration and control of grazing activities and their associated impacts. Monitoring data on range condition and utilization, however, provide only a small contribution to a complete understanding of affected resources, and existing and potential impacts associated with grazing.

Data on the diversity, distribution, and abundance of biological resources at the Seashore is fragmented. Data have been collected for some species, but these represent only a small percentage of the total number of plants and animals present. Acquisition of data on natural resources – comprehensive inventories – and assessment of how these resources are changing over time – monitoring – must be conducted as soon as possible to facilitate effective resource management.

An understanding of the Seashore's aquatic environments, including fresh and saltwater marshes, estuaries, streams, riparian areas, and marine intertidal ecosystems is crucial to their protection. Many of these environments are directly affected by activities currently occurring as well as by past landscape alterations and manipulations. Public concern over declining quality and quantity of aquatic and marine resources has focused attention on protection of wetlands and riparian areas, and on present and potential impacts of adjacent land use. Additionally, a number of affected species depend on adequate water quantity, which brings the Seashore into conflict with water use demands of state and municipal water authorities.

In addition to livestock, non-native wild and feral animals continue to alter ecosystems in the Seashore and their presence and associated impacts may preclude restoration on damaged habitats. Exotic deer, which inhabit large areas of the park, have unknown effects on native deer and may complicate range extensions of the reintroduced tule elk Feral predators, such as red fox (*Vulpes vulpes*) and house cats (*Felis domesticus*) are present at the Seashore, and can disturb small mammals and ground nesting birds.

Development and land use practices outside the Seashore also affect the park's natural and aesthetic resources. Municipal water developments, residential and community development, and agricultural activities have serious implications for stream and estuary water quality.

In summary, the most significant natural resource issues that must be addressed are:

- lack of basic knowledge to address resource threats or detect changes in resource condition;
- protection of water rights, quantity and quality, as well as associated habitats and flora and fauna;
- protection of threatened, endangered and rare plants and animals and their habitats;
- management of agricultural activities to ensure that range conditions improve, that actual and potential erosion problems are addressed, and that adequate protection is provided for wetlands, watersheds, aquatic systems and sensitive species;
- control of nonnative plants and animals that disrupt natural or prevent their restoration; and
- identification and correction of past disturbances that contribute to long-term degradation of the environment or impede restoration.

RESOURCE MANAGEMENT PROGRAMS

Threatened, Endangered and Sensitive Species

The Seashore is situated in a zone of overlap of two distinct bioregions (the Oregonian and the Californian), and consequently, there is great diversity of species, but also many rare and endemic species. Furthermore, the Seashore is located on a peninsula created by a major faultline and has endemic species associated with this isolated position. The Seashore has fully 66 special status species, including 19 federally listed plant species and 46 listed animals (Appendices 5 and 6).

Among the plant species, an additional 25 are listed or proposed for listing by the California Native Plant Society (CNPS). Among these are the federally listed Endangered beach layia (*Layia carnosa*), Tidestrom's lupine (*Lupinus tidestromii*), Sonoma alopecurus (*Alopecurus aequalis var. sonomensis*) and Sonoma spineflower (*Chorizanthe valida*). The latter species occurs only at Point Reyes.).

Among the animal species, the Seashore supports 14 species with federal status as Endangered, 8 as threatened and 24 species of concern. Examples of species include the endangered brown pelican (*Pelecanus occidentalis*) and Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*);

federally threatened species such as the northern spotted owl (*Strix occidentalis*), western snowy plover (*Charadrius alexandrinus*), and red-legged frog (*Rana aurora*). Rare species of note include the Pt. Reyes Mt. Beaver and Pt. Reyes jumping mouse found only at Point Reyes and the Ashy Storm-Petrel (*Oceanodroma honochroa*), found only in a few places in the world (Ainley 1995). Additionally, the Seashore is one of the primary "hot spots" in the U.S. for bird species, and of these, >247 are considered rare by the "Field Checklist of Birds for Point Reyes National Seashore (1992)."

Marine mammals, specially protected under the Marine Mammal Protection Act, are diverse and abundant at the Seashore, and many of them are also federally listed under ESA (see also section on Native Wildlife Mgt.). There are nearly 25 species of marine mammals that have been documented at Point Reyes, ranging from rare beaked whales such as Pygmy Sperm whale (*Kogia breviceps*) to the southern sea otter (*Enhydra lutris nereis*). Steller sea lion (*Eumetopais jubatus*), listed as federally threatened, inhabit the shore and forage in the waters of Point Reyes. The Steller sea lion colony at Point Reyes Headland has dropped dramatically over the past two decades and is on the verge of disappearing from the park. Twenty percent of California's breeding population of harbor seals occurs at Point Reyes (Allen et al. 1984). In 1981, northern elephant seals (*Mirounga angustirostris*) colonized Point Reyes Headlands and the colony has been expanding into areas accessible to the public (Allen et al. 1991). Gray whales were delisted in 1995, but are nevertheless afforded special protection as a marine mammal and are numerous during winter and spring migrations at Point Reyes. Humpback (*Megaptera novaeangliae*) and Blue (*Balaenoptera musculus*) whales, listed as endangered, are frequently observed in summer and fall.

Management of these species requires different levels of intensity depending upon the species and the potential stressors. Ranching activities, commercial fishing, recreational activities, oil spills, prescribed fire, and other park actions all have the potential to affect these species. Many of the proposed project statements attempt to alleviate, or remove, these stressors. Many other project statements address the utter lack of information that is available on the status and distribution of species.

Some species require immediate and direct intervention in order to protect and preserve their presence in the Seashore, as is the case of the western snowy plover. Over the past four years, the park has constructed exclosures around every nest found in order to protect the eggs and chicks from predation and human actions. This effort has resulted in an increase from 4 fledglings in 1995 to 25 in 1999. Other species, such as several listed plants associated with grazed lands, will require close study to determine what management actions will benefit preservation of the species.

Examples of project statements addressing threatened, endangered and sensitive species include the following:

Project N-24 Study Mt. Beaver distribution and ecology
Project N-38 Monitor northern spotted owls
Project N-40.1 Monitor northern elephant seals
Project N-50 Inventory and assessment of bats
Project N-51 Conduct inventory and assessment of amphibians

Project N-53 Survey and ecological study of rare animals
Project N-64 Monitor snowy plovers
Project N-78 Develop marine bird monitoring protocol
Project N-79 Develop marine mammal monitoring protocol
Project N-94 Inventory and monitor sandy intertidal zone
Project N-84.1 Inventory and monitor TES plants
Project N-84.6 Inventory and monitoring of TES animals

Native Plant Revegetation

The Seashore has numerous needs for native plant materials for revegetation of disturbed sites. Recent examples include stabilization of the Haggerty Gulch slide on the road to Limantour Beach, rehabilitation of construction impacts at the Youth Hostel, and revegetation/native landscaping of the site around the new Limantour restrooms. Additionally, long range plans for the Seashore include restoration of native perennial grasslands and rehabilitation of lands affected by non-natives such as Scotch broom and iceplant. In many cases, removal of non-native plants must be followed by introduction of native seed or propagules; otherwise the rehabilitated sites will lose soil through erosion or will become vegetated with other non-native plants.

Seed or propagule collection, processing, extension, and storage can be accomplished under contract, or can be accomplished by staff within the Seashore. A small native plant nursery has been established to propagate native plants for use in restoration projects. In 1998 and 1999, seeds were collected, and seedlings propagated for a riparian restoration project along Blue Line Creek. Propagules will be planted late in 1999 and early in 2000. The Blue Line Creek revegetation is a component of a larger, Seashore-wide coho salmon and steelhead habitat restoration project. The majority of nursery and plant propagation activities for this project have been conducted by vegetation management interns.

The minimal level of effort dedicated to plant propagation reflects the limited funding available for these activities. Revegetation using locally collected or propagated native plant species requires comprehensive knowledge of plant ecology and reproductive biology, as well as experience with seed collection and storage, and plant propagation techniques. The addition of a Native Plant Nursery Specialist to the vegetation management staff would provide oversight for all collection, propagation and husbandry of native plant materials.

By combining the knowledge and skills of the native plant nursery specialist with those of the Seashore's cultural resource manager, range manager, hydrologist, plant ecologist and wildlife specialists, a professional program of habitat restoration and rehabilitation could be undertaken, and would directly benefit Seashore resources.

Project statements directly relating to native plant protection and restoration include:

N-01.1 Implement Geographic Information System
N-30 Determine Pristine Coastal Prairie
N-32 Develop Resource Baseline Inventory.
N-36 Increase Resource Management Staffing

N-54 Conduct Ecological Study of T&E Plants
N-62 Ecological Restoration of Limantour Marsh

Management of Non-native Plant Species

Approximately 292 non-native plant species are known to occur at Point Reyes National Seashore. Comprehensive information on the distribution, density, rates of introduction, or rates of spread has not been collected for these species. Inventory, monitoring, and control of non-native plants have been limited due to inadequate funding and staffing. Several species-specific studies and projects have been conducted in the Seashore, but these have been limited in scale and scope and have focused only on the highest priority species. Comprehensive mapping of Pampas grass (*Cortaderia jubata*) and Scotch broom (*Cytisus scoparius*) is underway, mapping of cape-ivy (*Delairea odorata*) has been completed Seashore-wide, and iceplant (*Carpobrotus edulis*) around the Lighthouse has been completely mapped.

Non-native plant management efforts have focused on the eradication or control of the highest priority invasive plants identified in the Exotic Plant Management Plan (Addendum 4). Control efforts have been directed toward the California "A-Rated" species giant plumeless thistle (*Carduus acanthoides*) and fertile South African capeweed (*Arctotheca calendula*). Additional efforts have targeted populations of highly invasive species with potential to expand rapidly, such as water hyacinth (*Eichhornia crassipes*), yellow star thistle (*Centaurea solstitialis*), purple star thistle (*Centaurea calcitrapa*), oblong spurge (*Euphorbia oblongata*), Scotch broom, French broom (*Genista monspessulana*), and cape-ivy (*Delairea odorata*). Highly invasive plants such as Pampas grass, and non-native plant populations within designated wilderness areas also have been subject to removal efforts.

In 1995, the Vision Fire burned over 12,300 acres, much of it within Point Reyes National Seashore. Following the fire, FIREPRO funding was secured for three years (1996-1998) to monitor and remove non-native plants that were believed to be introduced or spread as a result of the fire or fire suppression activities. This funding supported removal of over three million non-native plants representing 52 species.

Prescribed fire has been used to control Scotch and French broom in several areas within the Seashore. In 2000, a research project, funded by FIREPRO, will begin to test the effectiveness of burning as a control measure for these species. Additional studies will evaluate the feasibility and effectiveness of using fire to control velvet grass (*Holcus lanatus*).

Cape-ivy, formerly known as German-ivy (*Senecio mikanioides*), is a non-native herbaceous perennial that has been identified as a very significant threat to natural resources in California. Point Reyes National Seashore and Golden Gate National Recreation Area support 265 known populations of cape-ivy. In 1998, NRPP funding was secured for FY99-2001 to stop the spread and reduce the size of these populations.

Numerous non-native plants have been removed through the efforts of Point Reyes' Habitat Restoration Program (HRP). For the past five years, this organization of dedicated volunteers has focused on removal of a wide variety of non-native plants, including iceplant and European beachgrass (*Ammophila arenaria*). These two non-native plants, which occur in coastal dune

habitat, pose a significant and immediate threat to a suite of federal and state listed plants and wildlife. Currently, efforts are underway to map and characterize remnant patches of native American dunegrass (*Leymus mollis*) habitat within the areas infested by iceplant and European beachgrass. Once the distribution and extent of native habitat is determined, removal strategies can be developed and removal efforts prioritized.

Range improvement practices undertaken by the Range Management Program are directed toward reducing non-native plant numbers through proper range use and an integrated pest management approach. A seeding list has been prepared with multiple-agency cooperation to promote the use of non-invasive varieties of commercial grass seed in range improvement programs. A comprehensive program to control and eradicate non-native plants is imperative to protect native plants and wildlife at Point Reyes National Seashore. Initial steps have been taken to develop this program. In 1999 Seashore vegetation managers helped spearhead development of the Marin County Weed Management Area. Developed under a Memorandum of Understanding (MOU), this "Area" includes federal, state, and county land management organizations, watershed districts, and private citizens. The signatories have agreed to cooperate to solve non-native plant problems across land ownership boundaries.

In June 1998, the Seashore hired a permanent Plant Ecologist, and in December 1999 a permanent Biological Technician with non-native plant management responsibilities was hired. The Non-Native Plant Management Plan (1989) is undergoing revision to reflect changing priorities and control strategies, with a projected completion date of June 2000. The Seashore would benefit greatly from the addition of two six month long seasonal positions dedicated to the management of non-native plants, which would permit more systematic data collection, data management, mapping, and control. Project statements directly relating to management of non-native plant species include:

N-01.1 Implement Geographic Information System
N-07 Control High Priority Exotic Plants
N-09 Eradicate Pampas Grass
N-10 Control Exotic Plants in Wilderness
N-32 Develop Resource Baseline Inventory
N-36 Increase Resource Management Staffing

Management of Native Wildlife

The native wildlife program at the Seashore has until recently focused primarily on birds (in cooperation with the Point Reyes Bird Observatory), heroic species such as tule elk, and northern elephant seals, and on specially protected species such as western snowy plover and big-eared bat. Within the past five years, though, the seashore initiated several projects, in cooperation with other agencies and organizations, addressing the distribution and abundance of multiple species in several ecosystems (e.g. coastal marine, wetland and forest lands).

Tule Elk

A major focus of the management of native wildlife at Point Reyes has been the reintroduction of tule elk (Cervus elaphus nannodes), a subspecies of elk endemic to central and coastal California

(McCullough, 1969). Hunted nearly to extinction in the Nineteenth Century, tule elk have recovered to moderate population levels throughout the state through the aid of state and federal legislation and management. Reintroduced to PORE in 1978, the elk population began to expand at an increasing rate in the late 1980s following range recovery from intensive cattle grazing. Habitat condition and population dynamics were evaluated from the time of reintroduction until the mid-1980s (Gogan, 1986). Seashore management actions following the conclusion of this study through the mid-1990s comprised population censuses, monitoring vegetative succession with photoplots, monitoring water sources, and minimal monitoring of forage utilization.

Early management of the tule elk herd was directed by an Interim Tule Elk Management Plan (1982) and by management recommendations in Gogan (1986). Due to the rapid growth of the tule elk herd in the late 1980s and early 1990s, a draft environmental assessment was prepared proposing the direct reduction of excess animals in accordance with the Gogan (1986) recommendations and consultations with concerned agencies. Public opposition to direct reduction has required that alternate means of population control be examined; see PORE-N-01, Control of Tule Elk Populations. In 1993, studies were conducted to estimate the carrying capacity of the tule elk range and to examine population dynamics and the need for population control. Remeasurement of 17 of Gogan's (1986) grassland transects revealed that, although forage quality had improved through vegetative succession, the area covered by these forage plants had decreased due to the expansion of unpalatable shrubs (Bartolome1993). A carrying capacity of between approximately 330 and 900 elk was estimated from measurements of forage availability. Utilizing this study and other data, a panel of wildlife specialists evaluated the population dynamics of the Point Reyes tule elk herd and made a number of recommendations for management (McCullough et al. 1993). This panel recommended that the elk population be allowed to regulate itself without culling or other intensive manipulation unless a predefined threshold of habitat degradation was exceeded. Establishment of this threshold would be through the implementation of a comprehensive program of habitat and population monitoring. They further recommended that agency culling be recognized as the ultimate control method in light of public opposition to hunting, that research into contraception and into Johne's disease be initiated, and that habitat and animal monitoring be expanded. They also recommended the addition of several female elk every generation to maintain genetic variation. Lastly, they recommended the elimination of exotic deer and removal of the fence across Tomales Point to promote the ultimate goal of a large, healthy, free-ranging population of elk throughout the Seashore. These goals were echoed by two subsequent scientific advisory panels convened in 1997.

Current management direction is provided by the Tule Elk Management Plan and Environmental Assessment (1998). This plan identifies five management goals: 1) Maintain viable populations of tule elk at Point Reyes, 2) Manage tule elk using minimal intrusion to regulate population size, where possible, as part of natural ecosystem processes, 3) Provide for a free-ranging tule elk herd in Point Reyes by 2005, 4) Research and monitor the habitat and elk population over time, and 5) Provide the public with interpretation and information on tule elk conservation biology and management.

The first step in realizing the goal of a free-ranging population of elk described in the 1998 Tule Elk Management Plan was taken in June, 1999, when 27 elk from Tomales Point were released

in the Limantour area, after six months in a holding pen where they were tested for disease and acclimated to their new surroundings.

Other wildlife management issues that are of significant concern but have received minimal attention due to lack of funding and staff resources are:

Marine Mammals (see also Threatened, Endangered and Sensitive Species Section)

The Marine Mammal Supplement (1980) to the Natural Resources Management Plan outlines management programs aimed at the protection of marine mammals but is woefully outdated. Breeding colonies of Northern elephant seals (*Mirounga angustirostris*) were established on the Point Reyes Headlands in 1981 and the colony has grown exponentially at an average of 16% per year and expanded onto adjacent beaches accessible to the public. There is potential for colonization on Limantour Beach and North Beach. Human/seal and pet/seal conflicts are likely to result from the growing seal population.

Point Reyes accounts for 20% of California's mainland breeding population of harbor seals, with major concentrations located within Drake's Estero and at Double Point. Several colonies within the seashore have been monitored since 1976 and have shown a four-fold increase in total population due to the protection afforded by the seashore status. Nevertheless, conflicts occur frequently between humans and harbor seals. Seals are susceptible to disturbance from hikers, boaters, and in Drakes Estero, from commercial mariculture activities. The seashore has undertaken an area closure, in Drakes Estero, and an information program to reduce human/seal conflicts. Agreements have been prepared between the seashore, state agencies, and the commercial oyster operator to minimize disturbance during the pupping season. A modest program of monitoring beach debris associated with commercial oyster farming has been initiated (See PORE-N-47).

The gray whale (*Echrichtius gibbosus*) was delisted from the endangered species list within the past three years because the population has recovered with an estimated world population of around 25,000 whales. With the increase in population size, gray whales are seen more frequently and in greater numbers at Point Reyes. In 1999, twelve gray whales spent several months in Tomales Bay and were observed feeding in the soft sediments of the bay. Whale-boat interactions increased because of the prolonged presence of the whales. Each year, dead gray whales, and other species of whale, wash ashore at the seashore and require scientific and management actions. White sharks occur in great abundance at Point Reyes and there are more human-shark interactions at Point Reyes than anywhere else in the world (1-2 shark attacks on people occur per year in the region). See N040, N084.001, N084.003, N079.001, N096 and N048.

Avifauna

Impacts to nesting birds during the breeding season through conflicts with dispersed recreationists and from grazing activities. The most notable example has been disturbances to the federally threatened snowy plovers (*Charadrius alexandrinus*) during the breeding season by recreationists and grazing cattle. Management efforts have been directed toward the exclusion of cattle from known critical areas and to signing. Little knowledge exists of the exact locations of

breeding plovers, their breeding success at PORE, nor the exact nature and scope of disturbance. With the new listed status of snowy plovers, the monitoring of their populations, and any threats to them, should be increased. Ravens are the primary predator of both snowy plovers and colonial nesting seabirds, and this species appears to benefit indirectly from ranching activities because ravens gain supplemental food from cattle bins that have cracked corn (see N064, N061, and N085).

Other species affected, both directly and indirectly, by human actions within the seashore include breeding seabirds at several coastal sites. Around 11 species of seabird nest at Point Reyes, and several of these species are special status (e.g. ashy storm-petrel, rhinocerus auklet). Seabirds are disturbed by commercial and sport fishermen and by recreationists in boats at Point Reyes Headland, Double Point and Tomales Point. The seashore is actively pursuing Marine Refugia designation for these sites.

Wetland and Riparian Species

Riparian areas with known sensitive wildlife have been excluded or partially excluded from disturbance by grazing activities. Little is known of the abundance, use or sensitivity of species inhabiting most of the wetlands within the Seashore. A basic inventory of wetlands and associated wildlife values needs to be accomplished to adequately address this issue (See PORE-N-59).

Species in Marine Ecosystems

The marine ecosystem of the Seashore is increasingly affected by visitors and commercial fishing activities. Point Reyes Headlands is recognized as an important source population for many significant invertebrate species in the coastal upwelling ecosystem, but the Seashore staff has little knowledge of the distribution or abundance of animals that inhabit the intertidal zone, the subtidal zone or the nearshore waters within the Seashore boundaries. Commercial and sport fishing activities are removing an unknown quantity of fish, some species of which are important prey for nearshore marine birds and mammals. An assessment of marine species (especially of invertebrates and marine fishes) is required urgently before initiating any management actions. (see also N84007, N077, N080).

Project statements directly relating to management of native wildlife species include:

N-01.1 Implement Geographic Information System
N-01 Manage Tule Elk Populations
N-06 Reintroduce Salmon and Steelhead
N-24 Study Mountain Beaver Distribution and Ecology
N-31 Study Big Eared Bat Ecology
N-32 Develop Baseline Inventory
N-36 Increase Resource Management Staffing
N-38 Northern Spotted Owl Ecology at Point Reyes
N-40 Northern Elephant Seal Monitor
N-48 Develop (update) Marine Mammal Management Plan

N-49 Extinction of Amphibians
N-50 Inventory and Assessment of Bats
N-51 Conduct Inventory and Assessment: Amphibians and Reptiles
N-52 Inventory and Ecological Study of Terrestrial and Freshwater Invertebrates
N-53 Survey and Ecological Study of Rare Animals
N-56 Conduct Survey of Terrestrial Mammal
N-62 Neotropical Migratory Birds
N-63.1 Monitor Intertidal Ecosystem
N-64 Monitor Snowy Plovers
N-84.1 Develop Pinniped Protocols
N-84.2 Develop Seabird Protocols
N-84.6 Protect Threatened, Endangered and Sensitive Animals
N-84.7 Monitor Marine Ecosystem
N-85 Distribution and Abundance of Common Raven
N-94 Inventory and Monitor Sandy Inter-tidal Ecosystem
N-96 Abundance and Distribution of White Sharks

Non-native Wildlife Mgmt

The Seashore is situated close to urban areas and within an agricultural zone, so consequently, it is not surprising that there are numerous non-native animals. The species range from non-native game introduced for hunting (deer and fish) to species hitch hiking on vessels from other parts of the world. Both vertebrate and invertebrate animals pose serious threats to health of the natural ecosystems of the Seashore. Threats occur in the form of competition with native species, predation and parasitism on native species, and disease transmission. Some species have the potential for significantly changing the function of an ecosystem (as in the case of the green crab), whereas others represent ecological functional alternates (as in the case of some of the ungulates).

Ungulates

Two species of non-native deer, axis deer (Axis axis), native to southern Asia, and fallow deer (Dama dama), native to Mediterranean Europe, were acquired from the San Francisco zoo and released at the Point Reyes Peninsula by a local landowner during the 1940s. The populations of both species were controlled by year-round hunting until the establishment of the national seashore. Beginning in 1967, hunting within the seashore was halted; a rapid increase in the numbers of axis and fallow deer followed.

A series of studies were conducted to census the exotic deer within the pastoral zone and to evaluate their impact upon resident dairy and beef cattle (Elliot, 1973;Wehausen, 1973; Elliot and Wehausen, 1974). A component of this program was a cooperative effort between the NPS and CDFG for the collection of animals for the studies. A recommendation by the Citizen's Advisory Commission in 1976 called for maintenance of the exotic deer herds at the population levels existing in 1973, estimated at 350 of each species, by direct culling by park rangers. Fallow and axis deer were subsequently removed, and data on them were collected, between 1976 and 1979.

In 1979 and 1980 a census of fallow deer within the legislated wilderness indicated a large and growing number of fallow deer. A program of direct control of exotic deer by culling within the wilderness and the pastoral zone commenced in 1980 and continued to 1994. In 1984, CDFG proposed that the exotic deer could best be managed through public sport hunting. Seashore legislation allows public hunting at the discretion of the Secretary of the Interior. Following public hearings conducted by the Citizen's Advisory Commission and opposition by local ranchers, this initiative was abandoned. The seashore at this time supports no public hunting within the seashore

The number of animals removed annually by rangers in the seashore between 1976 and 1994 ranged from 35 to 356, with a mean of 149. Over the life of the program, 69% of the animals removed were donated to Native American organizations or food charities. Animals culled in the wilderness were not retrieved. Staff reductions and added workload diminished the participation of park rangers in this program, and it was discontinued in 1994.

Gogan and Barrett (1986) counted fallow deer using a line-transect census method in coastal prairie habitat at point Reyes in 1980. Their estimate was 543 deer, with a 90% confidence interval of 205-881. This estimate approximated the 523 counted from a helicopter in the entire pastoral zone in 1977 (Elliott, unpubl.). No estimates of the number of fallow deer were made in coastal scrub or in forested habitats because of the difficulty of seeing animals there.

There is a lack of data regarding the effects that the control program had on the populations of these exotics. There have been no population estimates of fallow deer in the pastoral zone since 1980 (Gogan and Barrett 1986) and there is no statistically valid estimate of the number of fallow deer in the wilderness area. Gogan et al. (in prep.) modeled the growth of the populations of both species of exotic deer. They estimated annual growth rates of 17% for axis deer and 10% for fallow deer, near the respective estimates of 22% and 11% calculated by Wehausen and Elliott (1982). They estimated that the population goal of 350 was reached for fallow deer in 1990 and for axis deer in 1993. Their estimated carrying capacities were more than 550 for axis deer and 850 for fallow deer, and they stated that the deer could reach these carrying capacities within a decade of halting control. Such control was halted in 1994. Subsequently, there has been no attempt to hold the populations of the non-native deer at the targeted levels. Further, a wildfire that burned approximately 5,000 ha in 1995 likely had a major, positive impact on habitat for fallow deer, in particular. Anecdotal reports indicate that fallow deer have expanded their range to the south and east, reportedly occurring in or near the town of Bolinas and east of State Highway 1 in Golden Gate National Recreation Area. Depredations by fallow deer on gardens in the Olema Valley along Highway 1 were reported in 1999.

An important component of the development of a management program for non-native deer is current estimates of population size of both deer species. Further, a reevaluation of the original task directive from the CAC, made in 1976, should be undertaken. That recommendation was that populations of 350 of each species be maintained until scientific information indicated that the exotic deer were having a negative impact on the environment of Point Reyes. One report in 1983 concluded that, despite considerable overlap in diets, there was little impact on cattle or native ungulates within the pastoral zone from non-native deer. This conclusion was not universally accepted due to the study's restrictive nature and sample size. Another analysis of data from this study indicated that exotic deer may be reducing the carrying capacity of native

black-tailed deer by as much as 40% (Fellers, 1983 and per comm.). Reimann et al. (1979) determined that 10% of axis deer and 8% of fallow deer carried Mycobacterium avium paratuberculosis, the organism that causes Johne's disease. This is a bacterium that causes emaciation and death in cattle, and is present in the elk population at Tomales Point. Thus, exotic deer may be serving as a reservoir of this disease, with the potential to transmit it to the newly established tule elk herd at Limantour as well as to black-tailed deer.

Regardless of potential competition and disease issues, the presence of these non-native deer compromises the ecological integrity of the seashore and the attempts to reestablish the native cervid fauna comprising tule elk and black-tailed deer. Three scientific panels comprised of federal, state, and university researchers and managers convened at PORE during the 1990s to advise on management of tule elk recommended the removal of nonnative deer to promote native deer and elk.

Due to the non-native nature of fallow and axis deer, and to the potential for forage competition with native deer and elk and disease transmission to them, a determination of the feasibility of complete removal of the fallow and axis deer should be undertaken. The issue of exotic deer management consumes a considerable amount of staff time that could be devoted to other resource management needs. Removal of the exotic deer from the seashore would reduce a continual burden on the small natural resources staff, improve a major component of the ecosystem, provide additional habitat for native ungulates, and eliminate the potential for disease transmission from these exotics to native deer and elk.

Red fox

The invasion of Point Reyes by red foxes (*Vulpes vulpes*) poses a significant threat to native canids, small mammals, and ground-nesting birds. Red foxes have been observed in areas where they could affect nesting seabird colonies (Allen, pers. comm.). An evaluation of the scope of this problem should be undertaken (see PORE-N-46) and a control program implemented.

Avian non-natives

Several bird species pose a threat to native species including parasite cowbirds, European starlings, and wild turkeys (*Meleagris gallopavo*). Turkeys have recently been observed in the park. Although widely disseminated by the State of California for hunting, they are not native to California, and the seashore should take steps to prevent them from becoming established. Other alien species such as common peafowl (*Pavo cristatus*) also present a threat to native ground nesting birds and small animals.

Marine non-natives

There are a number of non-native marine invertebrate species and fishes that have been introduced into the marine and estuarine systems over the past 100 years at the seashore. Examples include the green crab (), Sacramento perch (*Centrarchus macropterus*) and mosquitofish (*Gambusia affinis*). Most of these were introduced by oyster farming operations, fish introductions or from bilge water pumped from visiting vessels (Carleton 1979). An estimated 75% of the marine fauna of San Francisco Bay is non-native and the seashore has concern that some of these species may migrate north. The park needs a current inventory of

these species and a strategy for preventing new introductions. Only in the past two years was the park aware of more recent potential introductions at ongoing oyster operations in Drakes Estero and Tomales Bay.

A wildlife specialist with training and experience in non-native species management, and capture and immobilization techniques, is necessary to professionally address and manage these issues as a part of an overall non-native wildlife management program. Non-native animal issues need to be integrated with other resource programs including agricultural management and cultural resources management.

Project statements directly relating to management of alien animal species include:

N-02 Control Exotic Deer
N-16 Control Feral Pigs
N-32 Develop Resource Baseline Inventory
N-36 Increase Resource Management Staffing
N-46 Monitor and Control Exotic Predators
N-47 Evaluate Impacts of Commercial Oyster
N-60 Remove Feral Peafowl
N-61 Cowbird Removal

Air Resources Management

Point Reyes National Seashore is officially classified as a Class I air quality area. Air quality is generally excellent throughout much of the year due to a stationary marine high-pressure system. During the fall of the year as the high pressure system moves off the coast, stagnant polluted air from the metropolitan San Francisco Bay Area can invade the Point Reyes area for a number of weeks.

The National Park Service began air quality monitoring for criteria (O_3) gasses, particulate matter and visibility in 1987. Criteria monitoring was discontinued in 1992 due to lack of funding. An IMPROVE sampler and visibility camera remain in operation and are operated by the Division of Resource Management and Visitor Protection with support from the Air Quality Division. Long-term vista monitoring is accomplished every five years.

Project statements directly relating to management of air resources:

N-19 Monitor Air Resources

Water Resources Management

Water resources management has focused primarily upon documenting and securing water rights. The Seashore participated in the State Water Resources Control Board hearings to determine water releases to Lagunitas Creek. Coordination has been facilitated between the SWRCB and the Water Resources Division (NPS) regarding water rights applications and permits. A number of meetings have been held between the seashore, Johnson Oyster Company and state and federal agencies to reach agreement on procedures to reduce debris and waste entering Drakes Estero as a consequence of mariculture operations. Through the range

management program and cooperation with the SCS, efforts have been made to improve dairy waste management and prevent contamination of waterways. The seashore has cooperated with a number of state agencies and private researchers to facilitate water quality research and monitoring within Drakes Estero. Two contract studies have been completed relating to water quality; "Pollution Studies of Drakes Estero, and Abbott's Lagoon Point Reyes National Seashore California, USA" (Anima 1990) and "Olema Creek Sedimentation and Erosion Survey" (Hantzsche et. al., 1990)

The water resources of Point Reyes are in large part the raison d'être of the Seashore. Major aquatic resources such as Tomales Bay, Drake's Estero, Estero de Limantour, Abbott's Lagoon, Lagunitas and Olema Creeks, and the associated wetlands and riparian areas, have significantly influenced the flora and fauna of Point Reyes. Water resources management to date has been driven mostly by immediate or external threats associated with water rights issues. Some work has been done to address water quality concerns from grazing and dairy operations, but no programmatic monitoring has been accomplished. A comprehensive program of inventory, monitoring and management is needed to properly protect these unique resources and the fauna and flora dependent upon them.

The first step in this process has been to inventory water rights and take measures to protect them. The continuation of this process needs to focus upon inventorying all water resources, quantifying them, establishing baseline conditions and implementing an ongoing monitoring and management program. To adequately undertake such a comprehensive water resources management program, which integrates concurrent resource management activities such as agricultural management and the management of habitats, a water resources specialist and support staff is needed. A professional hydrologist with the appropriate training and experience would allow the seashore to prepare a programmatic plan integrating other resource concerns and provide the expertise to protect water resources from both internal and external threats.

Project statements directly relating to management of water resources:

N-1.1 Implement Geographic Information System
N-12 Control Ranchland Erosion
N-21 Restore Eroded Parklands
N-33 Develop Water Resources Management Plan
N-37 Assess Water Rights
N-47 Evaluate Impacts of Commercial Oyster Farming on Drakes Estero
N-32 Develop Resource Baseline Inventory.
N-36 Increase Resource Management Staffing
N-58 Inventory of Water Resources
N-59 Inventory Wetlands

Management of Agricultural Uses

Enabling legislation, amendments and the legislative history of the intent of Congress indicate that traditional agricultural activities are to continue within the pastoral zone of Point Reyes National Seashore and portions of the Northern District of Golden Gate National Recreation Area. Agricultural pursuits consist mainly of dairy and beef cattle ranching. Resident ranchers

operate under a number of administrative agreements, which are subject to the authority of The Secretary of the Interior. These agreements may be terminated by the Secretary for non-compliance with the purposes of the enabling legislation and amendments, or if it is determined that such lands are needed for resource management or interpretive purposes (PL 95-625 & 96-199).

Agricultural use management within the pastoral zone and the Northern District of Golden Gate is directed by the Point Reyes Range Management Guidelines (RMG 1988, 1990) (Addendum 1). The objectives of the RMG are to insure the viability of traditional agricultural pursuits while providing for the protection of natural and cultural resource values and for the improvement of range condition. Overall direction is guided by NPS Management Policy toward: 1) managing these resources to maintain and perpetuate their inherent integrity, 2) to avoid unnecessary alteration of natural ecosystems or interference with natural processes, and 3) to require livestock numbers or use to be kept at a level within the carrying capacity of the area being grazed. Specific resource goals are enumerated within the Range Management Guidelines (Addendum 1). The major components of the Range Management Guidelines consist of the following:

Ranch Planning

Working in conjunction with the ranchers, the PORE Range Specialist will develop Ranch Conservation Plans to help plan for proper conservation methods and mitigation measures at the ranch level. The Ranch Plan for each ranch will describe the current resources and facilities, identify the problems, the priority areas that should be treated, resource goals and objectives, and the recommended actions to initiate recovery, including costs and implementation schedule. Appropriate mitigation and management measures for the protection of water quality, soils, and high value wetland and riparian areas may include: livestock exclusion fencing, development of off-site water facilities, alternative grazing systems, constructing stream crossings for livestock, stream bank stabilization and designs for improved on-land waste disposal.

Range Monitoring

A range evaluation and monitoring program has been established through cooperation with the University of California. Range resources are stratified based upon the principle of range site, and areas within those sites are selected which represent the average condition or are indicator areas. These are known as “key areas” (Society for Range Management, 1983). Within each key area 100M monitoring transects are established. Measurements are taken at these sites to evaluate range condition and range utilization.

During the peak growing period species composition and vegetative trend are monitored. Transects were intensively sampled during the first five years of the program to provide a baseline. The frequency of continued monitoring has diminished with time until a number of transects are read on a three year cyclical basis. On average, approximately 18 composition and trend transects are read annually. These transects will provide information regarding the health of the range as indicated by the composition of desirable/undesirable plants, the percent composition or annual/perennial plants, native versus exotic plants and the forage value of species present. Over time this monitoring will indicate the trend of the range in response to changes in use and management action and variations in precipitation.

At the end of the grazing season, usually September through October, each transect in all key areas are sampled for residual dry matter (RDM) or mulch residue. Residual dry matter monitoring is a system designed to maintain adequate vegetative cover for the protection of soil resources (Soil Conservation Service, 1979; Bartolome et. al., 1980; Clawson et. al., 1982). Additionally, adequate mulch residue provides micro-habitat for the fostering of renewed growth. A total of 55 RDM sites are monitored, including areas withdrawn from grazing which serve as control areas. Dry matter is evaluated utilizing the "Double Sample Weight Estimation Method" (Wilm, where ocular estimates of residue are correlated with actual vegetative clipping). Clipped material is dried, weighed and analyzed utilizing a computerized statistical program. Based upon the statistical results, a range observer maps each ranch unit and stratifies the area into levels of range utilization based upon four classes equated to minimum amounts of residual dry matter expressed in pounds/acre, Severe (0-600 Lb.), Heavy (600-1200 Lb.), Moderate (1200-1800 Lb.) and Light (>1800 Lb.). The minimum standard established for adequate slope protection is 1200 Lbs.

Based upon overall range utilization mapping in relation to the standard, management alternatives, such as reduced stocking rates, changes in class of animal or timing and duration of grazing, or implementation of range improvements to improve distribution, are exercised to achieve future adherence to the RDM standard.

Erosion Control and Cultivation

Approximately 1,400 acres within the seashore are cultivated for the production of oat silage used as supplemental feed. Cultivation plans were prepared in coordination with the Natural Resources Conservation Service (SCS) to insure adequate protection against erosion and soil loss.

Many of the resource management activities associated with the Pastoral Zone and its agricultural practices embody issues relating to both natural and cultural resources. Numerous ranch facilities are historic and require management to preserve the historic fabric. Ranch activities and their implementation directly effect these cultural resources and the cultural landscape, as well directly affecting natural resources. The Range Management program is implemented by one professional Rangeland Management Specialist, with occasional assistance from one seasonal employee. Park rangers within the Division of Visitor Protection serve as liaison with individual ranch operators to insure compliance with permit and lease conditions and to assist in gathering information relative to the management of each ranch unit.

Approximately 30% of the lands administered by Point Reyes National Seashore are in agricultural use. A preponderance of rare, threatened or endangered plant and animal species occur within agricultural use areas, and in some cases it appears that grazing use may have contributed to the viability of some of the rare, threatened or endangered plants. All of the Drake's Estero and Abbott's Lagoon watersheds, and portions of the Tomales Bay and Bolinas Lagoon watersheds, including Lagunitas, Olema and Pine Gulch Creeks, are within the agricultural use zone. Water quantity and quantity values and their effects upon habitat for these species of concern are important resource issues directly affected by agricultural management. Some resource issues are such as grazing monitoring, erosion control, exotic plant control are being addressed. Further integration with other resource activities is needed to enhance

protection of water resource values and their effect upon the protection of wildlife species, especially those of special concern. To be fully effective, additional staff, particularly at the technician level, is needed to carry out a more comprehensive field monitoring and inventory program and to free the Rangeland Management Specialist for ranch unit planning, coordination with cultural resource managers and natural resource specialists. Additional specialists are required to provide professional management of wildlife, vegetation and water quality/quantity issues.

Project statements directly relating to management of agricultural activities and resource use include:

N-01.1 Implement Geographic Information System
N-04 Manage Cattle Grazing
N-12 Control Ranchland Erosion
N-23 Evaluate Cattle Impacts to Park Rangelands
N-32 Develop Baseline Inventory
N-33 Develop Water Resources Management Plan
N-36 Increase Resource Management Staffing
N-37 Assess Water Rights
N-55 Map Existing, Historic And Potential Veg Communities
N-58 Inventory Water Resources
N-59 Inventory and Map Wetlands

Prescribed Fire Management

The Point Reyes National Seashore Fire Management Plan was approved in 1988 and was revised in 1993. Another revision of the Fire Management Plan is underway, with an anticipated completion date of December 2000. The 1993 version will be attached to this Resource Management Plan as Appendix XX and the 2000 version will be attached upon its completion.

Prescribed fire management is implemented under the direction of Prescribed Fire Specialist who is NPS certified as a Burn Boss II. The Point Reyes/Golden Gate Fire Management Officer provides logistical and fiscal support to the program.

The 2000 revision of the Fire Management Plan is being developed following guidelines presented in Chapter 4 of NPS Reference Manual (RM) 18. The revision will address both wildland and prescribed fire. It will discuss the relationship between the Seashore's Natural and Cultural Resource Management objectives and Fire Management objectives, and will describe means by which the fire management program will help achieve natural and cultural resource objectives. The revision will incorporate a programmatic approach to environmental compliance (e.g., NEPA).

In 1999, the Seashore secured FIREPRO funding to begin a research project designed to determine the effects of prescribed burning on selected biological resources. The research study plan is being developed, and includes studies on non-native plants, rare plants, and a suite of wildlife species. The studies are expected to occur between 2000 and 2002. Results of these

studies will be used to help determine where and when prescribed fire can benefit or harm the targeted resources.

In 2000, a permanent Fire Ecologist will be hired and will be duty stationed at the Seashore. This employee will be responsible for analyzing data collected from the NPS Fire Effects Monitoring program at Point Reyes National Seashore, Golden Gate National Recreation Area (NRA), Pinnacles National Monument, Channel Islands National Park (NP), Lake Mead NRA, Joshua Tree NP, and Santa Monica Mountains NRA. This position will be supervised by the Seashore's Plant Ecologist with oversight from the Pacific West Region Fire Effects Specialist.

N-01.1 Implement Geographic Information System
N-01 Manage Tule Elk Populations
N-03 Fire Management
N-07 Control High Priority Exotic Plants
N-32 Develop Resource Baseline Inventory.
N-36 Increase Resource Management Staffing
N-57 Evaluate Fuel Loadings Along Park Boundary

Information Management

The purpose of an Information (Data) Management Program is to provide standards for the management of digital data pertaining to the natural and cultural resources at Point Reyes to ensure the protection, reliability and availability of that data. A metadata system for data management is an essential part of any institution where pieces of information must be organized into a reliable, useable form and stored in such a way as to be available for future use by a variety of people. A standardized, systematic approach is necessary to minimize error in the data and assure its longevity. The proper management of data can be divided into a number of phases, Planning and Design, Collection and Data Entry, Quality Assurance, Documentation, Access, Security, and Archiving.

Natural resource data is collected by a number of different programs and activities engaged in the management of Point Reyes National Seashore. The Wildlife, vegetation, fisheries, range, fire, and hydrological management programs are all collecting resource information for the park. In addition data on climate, various programs within the park are collecting wildlife observations. Information on archaeological sites, historic structures, and submerged cultural resources are generated and maintained by the cultural resources program. Objects of cultural and natural significance are accessioned into the museum collection database, which is maintained by the Division of Interpretation. Outside researchers from other agencies, universities, and private organizations working under permit or contract are also contributors of resource data including information relating to oceanography, geology, and cultural resources. Graduate students from a wide range of institution continue to conduct research on the natural, cultural and sociological aspects of Point Reyes.

All of these databases will be georeferenced where appropriate and stored in a central location. Non-sensitive data will be placed on the park web-site for public access to information.

For further information regarding the data management, see the Information Management Plan. Most information management needs are addressed within project statements; however, a few specific project statements follow:

N-28 Compile Resource Management Database
N-59 Inventory and Map Wetlands
I-1 Geographic Information Systems
I-1.1 Geographic Information Systems
I-1.2 Geographic Information Systems

Staffing

Since the initiation of park operations at Point Reyes National Seashore, the natural resources management function has been implemented through 1985 by a staff of two park rangers. In 1985 a professional range conservationist was added to the staff to manage the extensive agricultural activities occurring within the national seashore. The first two decades of natural resources management at Point Reyes have focused upon alien species control, a small amount of native wildlife management and land protection and erosion control. A myriad of natural resource issues, internal and external threats to resources and basic inventorying and monitoring of resources, including mandated program such as threatened and endangered species conservation, have gone unaccomplished due to the disparity between the magnitude of need and available staff resources. Some issues are complex and specialized and would require professional expertise beyond the present capabilities of existing staff. The need for a professional and integrated program of natural resources management is well documented within this plan. Proper and professional understanding and management of the natural and cultural resources and threats to their protection within the park will require the expansion and professionalization of the resource management staff.

The current resource staff at Point Reyes National Seashore is presented below (Figure 2). Current staff is unable to keep pace with the scope of resource management needs or properly address increasing demands upon or threats to resources.

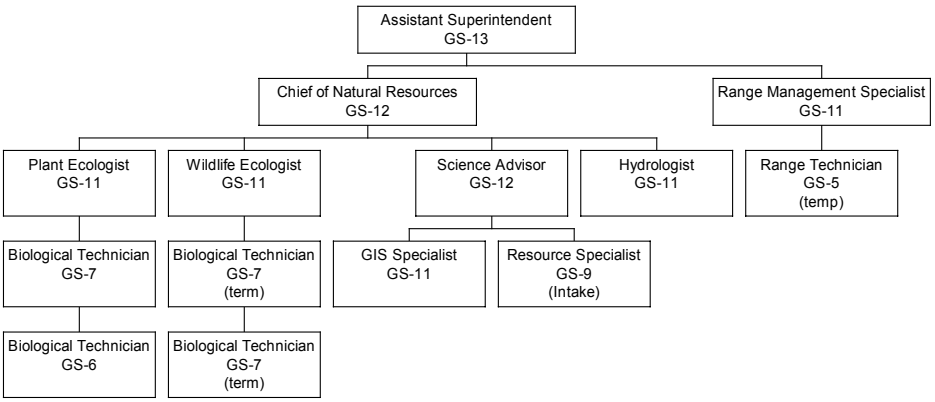


Figure 2
Current Natural Resources Management Organization

To implement the programs and needs presented in this plan a staff of professional resource specialists and administrative support as indicated in Figure 3 is required. Such a staff as illustrated below would provide the breadth of knowledge and level of skill necessary to address the major resource issues facing the national seashore.

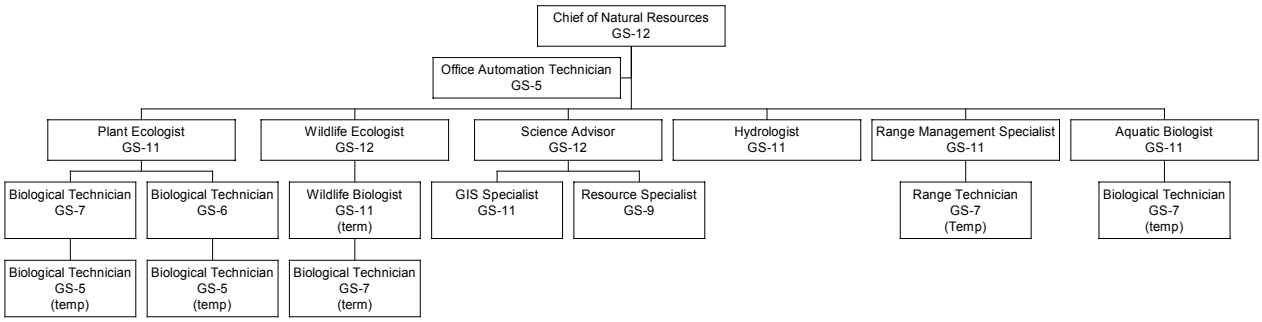


Figure 3
Proposed Natural Resources Management Organization

Table 4A Natural Resource Management Budget Summary

NATURAL RESOURCES	FY –2 Actual ($000)	FY –1 Actual ($000)	Current FY Actual ($000)	FY +1 Estimated ($000)	FY +2 Projected ($000)
Park Base	192.3	439.4	512.1	532.6	553.9
Cluster/Region	51.0	53.4	30.0	30.0	0
WASO/National	299.4	421.5	138.0	147.0	0
Fee Demonstration	0	0	9.0	0	0
Other non-NPS agency	0	98.0	99.0	50.0	0
Donation	42.6	57.0	51.3	22.3	0
Other	74.0	34.3	0	0	0
Total	**659.3**	**1103.6**	**839.4**	**781.9**	**553.9**

Table 4B Cultural Resource Management Budget Summary

Source	**FY -2 Actual ($000)**	**FY -1 Actual ($000)**	**Current FY Actual ($000)**	**FY +1 Estimated ($000)**	**FY +2 Projected ($000)**
Park Base	0	0	15	30	460[1]
Cluster/Region[2]	150	150	343	680[3]	700
WASO/National	80	40	0	50	1050[4]
Fee Demonstration	0	0	0	0	0
Other non-NPS agency	0	0	0	0	0
Donation	0	0	0	100	200
Other (Fee)	45	45	86	100	120
Total	**$275**	**$235**	**$444**	**$960**	**$2,530**

[1] Includes estimated $400k base increase for cultural resources.
[2] CRPP, CCM and Repair/Rehab funding

[3] Includes estimated $330k repair rehab funding for Home Ranch Main House Rehabilitation
[4] Includes estimated $1M line item construction funding for Lighthouse Site Rehabilitation.

Table 4C Integrated Natural/Cultural Resource Management Budget Summary

INTEGRATED NATURAL/CULTURAL RESOURCES Source	FY –2 Actual ($000)	FY –1 Actual ($000)	Current FY Actual ($000)	FY +1 Estimated ($000)	FY +2 Projected ($000)
Park Base	18.2	31.4	54.5	56.7	58.9
Cluster/Region					
WASO/National	6.8				
Fee Demonstration	2.0				
Other non-NPS agency					
Donation					
Other	12.0				
Total	***37.0***	***31.4***	***54.5***	***56.7***	***58.9***

Table 5A - Natural Resource Projects

Project No	Project Title	Priority	Unfunded Amount ($000)
N-1.1	Manage Tule Elk Populations, Monitor Vegetation Impact	Ongoing	91
N-1.2	Manage Tule Elk Populations, Monitor Elk	Ongoing	75.6
N-1.3	Manage Tule Elk Populations, Manage Elk Population	Ongoing	200
N-1.4	Manage Tule Elk, Range Expansion	Ongoing	211.3
N-2.0	Control Exotic Deer	16	34.5
N-2.1	Control Exotic Deer – Exotic Deer Immunosterilant		
N-3.0	Fire Management	50	11.2
N-4.1	Manage Cattle Grazing, Monitor Grazing	Ongoing	102.8
N-4.2	Manage Cattle Grazing, Administer Leases	Ongoing	
N-6.0	Restore Salmon and Steelhead	Funded	57.6
N-7.0	Control Highest Priority Nonnative Plants	18	116.8
N-7.1	Revise Non-native Plant Management Plan	19	
N-7.2	Eradicate Selected Invasive Non-native	32	
N-7.3	Control Selected Invasive Non-native p	13	
N-7.4	Remove Cliffside Pampas Grass in Wilderness		
N-9.1	Protect rare native Plant Communities	33	
N-9.2	Refine Vegetation Map to Protect T&E Species	54	
N-9.3	Restore Native Coastal Prairie Grasslands	36	
N-10.0	Protect T&E Plant Species	23	
N-10.1	Conduct Supplemental Survey for T&E Plants	3	
N-10.2	Monitor T&E Plant Populations	15	
N-10.3	Mitigate Cattle Grazing impacts on T&E Plants	29	
N-12.0	Control Ranchland Erosion	31	77.3
N-13.0	Maintain Tule Elk Fence	Ongoing	42.6
N-16.0	Control Feral Pigs	Discontinued	
N-19.0	Monitor Air Quality	44	140
N-20.0	Administer Resource Management Program	Ongoing	
N-21.0	Erosion Control - Land Restoration	55	324.6
N-23.0	Evaluate Cattle Impacts to Park Rangelands	Ongoing	12.5
N-24.0	Study Mountain Beaver Distribution and Ecology	37	30
N-28.0	Compile Resource Management Database		22
N-30.0	Characterize and Preserve Coastal Vegetation		47.2
N-31.0	Study big eared bat Ecology	35	35.5
N-32.0	Develop a Resource Baseline Inventory	See N-84.8	71.2
N-33.0	Develop Water Resources Management Plan	Completed	23.5
N-34.0	Administer Scientific Research Program	Ongoing	88.9
N-36.0	Resource Management Professionalization	Ongoing	434.4
N-37.0	Assess Water Rights	Completed	
N-38.0	Spotted Owl Ecology at Point Reyes	10	51

N-38.1	Northern Spotted Owl Demographics at the Southern End of its Range		
N-38.2	Develop Long-term Monitoring Protocol for orthern Spotted Owls		
N-39.0	Wilderness/Backcountry Management Plan	Ongoing	22
N-40.0	Northern Elephant Seal Management Plan	Completed	
N-40.1	Monitor Northern Elephant Seal Colony	34	25
N-41.0	Rehabilitate Backcountry Trails		360
N-42.0	Hazard Tree Removal	Ongoing	40
N-43.0	Rehabilitate Backcountry Camps	Completed	
N-44.0	Animal-proof Trash Receptacles	Completed	
N-45.0	Trail Management Plan	Ongoing	40
N-46.0	Monitor and Control Exotic Predators	30	25
N-47.0	Evaluate Impacts of Commercial Oyster	14	50
N-48.0	Update Marine Mammal Management Plan	47	25
N-49.0	Extinction of Amphibians	48	20
N-50.0	Inventory and Assessment of Bats		27.6
N-51.0	Conduct Inventory and Assessment: Amphibians	49	63.2
N-52.0	Ecological Study of Terrestrial & Freshwater Inverts	43	73.2
N-53.0	Survey and Ecological Study of Rare Animals	45	93
N-54.0	Conduct Ecological Studies to Preserve T&E Plants	24	463.1
N-55.0	Map and Describe Existing and Historic Vegetation		72.2
N-56.0	Conduct Survey of Terrestrial Mammals		76.2
N-57.0	Evaluate Fuel Loadings Along Park Boundary	9	17
N-58.0	Inventory of Water Resources	38	175
N-59.0	Inventory and Map Wetlands	Funded	34.6
N-60.0	Control Exotic and Feral Animals		26.5
N-61.0	Cowbird Removal	Discontinued	20.1
N-62.0	Conservation of Migratory Songbirds	25	18
N-63.0	Establish Intertidal Monitoring Program	20	142
N-64.0	Monitor Snowy Plovers	2	37
N-65.0	Monitoring of Water Quality Status and Trends	28	
N-65.1	Impacts of Grazing, Agriculture on Water Quality	29	
N-66.0	Management Inventory of Pastoral Operations	6	160
N-67.0	Control non-Point Source Pollution	11	345
N-67.3	Construct and Restore Facilities to Reduce NPS	12	
N-68.0	Wetland Assessment, Protection and Restoration	Funded	75
N-68.2	Restore degraded Wetland Resources	57	
N-68.3	Acquire National Wetlands Inventory Resources Data		
N-69.0	Inventory & Control Critical Erosion Abbott's Lagoon	17	428
N-70.0	Management Plan; Protect Drake's & Limantour Esteros		15
N-71.0	Investigation of Abbott's Lagoon-WQ and Biology	Funded	100
N-71.0	Protect & manage Sensitive Resources		
N-72.0	Olema Creek Watershed Management Plan	26	60

N-73.3	Ecological Restoration of Limantour Marsh, Remove Exotics	See N-83	18
N-74.0	Mt. Vision Fire - Rehabilitation and Monitoring	Completed	
N-74.1	Vision Fire - Spotted Owl Long-term Monitoring	Completed	
N-74.1	Vision Fire - GIS Analysis and Support	Completed	
N-74.11	Vision Fire - Mapping	Completed	
N-74.12	Vision Fire - Dozer Line Rehabilitation	Completed	
N-74.13	Vision Fire - Replace Boundary Fence	Completed	
N-74.14	Vision Fire - Trail Monitoring and Safety	Completed	
N-74.2	Vision Fire - Monitor Pt. Reyes Mt. Beaver	Completed	
N-74.3	Vision Fire - Monitor pt. Reyes Jumping Mouse	Completed	
N-74.4	Vision Fire - Monitor Myrtle's Silverspot Butterfly	Completed	
N-74.5	Vision Fire - sensitive aquatic Species	Completed	
N-74.6	Vision Fire - Monitor and Control. Exotic Animals	Completed	
N-74.7	Vision Fire - Monitor Water Quality Impacts	Completed	
N-74.8	Vision Fire - Monitor Noxious Weeds	Completed	
N-74.9	Vision Fire - Monitor T&E Plants	Completed	
N-75.0	Prescribed Fire Management		54
N-76.0	Monitor estuarine Circulation & Salinity	42	78.3
N-77.0	Develop Pelagic Resources Monitoring Protocols	46	20
N-78.0	Develop Marine Bird Monitoring Protocol	21	75
N-79.0	Develop Monitoring Protocols for Pinnipeds	51	20
N-79.1	Develop Monitoring Protocols for Harbor Seals	52	35
N-80.0	Develop Subtidal Resource Monitoring Protocols		
N-81.0	Restore Ranchland Quarries	8	
N-82.0	Restore Dune Habitat to Protect T&E Species	1	1,800
N-83.0	Coastal Watershed Restoration and Enhancement	5	1099
N-84.0	Develop an Inventory and Monitoring Program		521
N-84.1	Inventory and Monitoring, Develop Pinniped Protocols	54	15
N-84.2	Inventory and Monitoring, Develop Seabird Protocols	23	75
N-84.3	Inventory and Monitoring, Develop Mammal Protocols	Ongoing	
N-84.4	Inventory and Monitoring, , T&E Plants	7	
N-84.5	Inventory and Monitoring, Algae/Fungi/Lichens/Bryophytes		
N-84.6	I&M, Monitor and Protect T&E Animals		
N-84.7	I&M, Assess/Monitor Marine Ecosystems		
N-84.8	Develop a Baseline Inventory of Basic Resources		71.2
N-84.9	Initiate Multi-species Biological Inventory	4	341
N-84.10	Inventory Marine Ecology System		
N-85.0	Distribution and Abundance of the Common Raven	19	30
N-86.0	Contain Cape Ivy in PORE and GOGA	Funded	209
N-88.0	Fixed Station Monitoring of CSRP Streams	Funded	138
N-88.1	Synoptic Bedload & Sediment sampling of Streams Supporting Coho Salmon and Steelhead Trout		
N-89.0	Develop Eucalyptus Control Plan		

N-90.0	Produce Non-native Plant Identification		
N-91.0	Rehabilitate native Plant nursery		
N-92.0	Condition Assessment, Removal & Restoration of Plants		
N-92.1	Physical & biological assessment of impoundments supporting CA red-legged frogs		
N-93.0	Construct Cheda Creek Riparian Exclusionary Fence		
N-94.0	Inventory and Monitor Sandy Intertidal Transition Zone	40	
N-95.0	Conservation of Subtidal Marine Resources	441	
N-96.0	White Shark Attendance at Point Reyes		
N-97.0	Evaluate and Control Flooding of Park Headquarters	Completed	
N-98.0	Air Quality Visibility Camera	Completed	
N-99.0	Science Program Administration		
N-100.0	Restoration of Giacomini Wetland		
N-100.1	Giacomini Technical Assistance		
N-101.0	Threatened Western Snowy Plover Protection		
N-102.0	Maintain Riparian & Erosion Control Protection Sturctures		
N-103.0	Quarry Gulch Stream Channel Restoration		
N-104.0	Protect and Restore Degraded Natural Resources in Pastoral Zone		
N-105.0	Randall Slide Stabilization Project		
N-106.0	Restoration of Horseshoe Pont to Coastal Lagoon		
N-106.1	Horseshoe Pond Dam Removal		
N-107.0	Effects of Immunocontraception on Behavior and Breeding Biology of Tule Elk at PORE		
N-108.0	Habitat Assessment of the Federally Endangered Myrtle's Silverspot Butterfly		
N-109.0	Point Reyes Lighthouse Headlands Iceplant Removal		
N-110.0	Preserve Federally Endangered Sonoma Alopecurus		
N-111.0	Develop Monitoring Protocol for Algae		
N-112.0	Northern Spotted Owl Demographics at the Southern End of its Range		
N-113.0	Reduce Elk Impacts to Habitat and T&E Species		
N-114.0	Solar Powered Vehicles		

Table 5B - Cultural Resource Projects

Project No.	Project Title	Priority	Unfunded Amount ($000)
C-2.2	Submerged Cultural Resources		
C-4.0	Stabilization-Lifeboat Station Railway		
C-5.0	Oral History		
C-9.0	Rehabilitate Main House - Pierce Ranch		
C-17.0	Backlog Cataloging		
C19.0	Archeological Survey - Update		
C-21.0	Cyclic Maintenance Historic Structures		
C-24.0	Park Administrative History Study		
C-26.0	Condition Assessment for Point Reyes Ranches		
C-28.0	Ethnographic Overviews and Assessments		
C-31.0	Manage/Upgrade ANCS Museum Database		
C-32.0	Construct New Museum Storage		
C-41.0	Historic Resource Study of Tomales Bay		
C-42.0	NAGPRA Cultural Affiliation and Lineal Decent Study		
C-43.0	Stabilize Historic Hagmaier Residence		
C-45.0	Stabilize Eroding Archeological Site MRN-249		
C-46.0	Cultural Landscape Report		
C-47.0	Historic Resource Study of Tocaloma		
C-48.0	National Register Nomination PORE Ranches Historic District		
C-49.0	Stabilize Historic Ranch Fences		
C-50.0	Stabilize Historic Ranch Tree Groves		
C51.0	Preserve L Ranch Cultural Landscape		

Table 5C - Integrated Resource Projects

Project No.	Project Title	Priority	Unfunded Amount ($000)
I-1.0	Geographic Information Systems – Acquire Hardware	Completed	
I-1.1	Geographic Information Systems – Implement GIS	Completed	
I-1.2	Vegetation Mapping Based on LANDSAT Imagery	Funded	
I-2.0	Lighthouse Potable Water Supply and WasteMgmt.		
I-3.0	Develop Digital GIS Infrastructure		
I-4.0	GIS, Purchase HP DesignJet 1055C Plotter	Funded	800
I-5.0	Zero-Emission Vehicle		

APPENDICES

Appendix 1 Completed Projects

Project	Title	Status
RM-05	Control of Dogs and Cats	Suspended
RM-08	Backcountry Management	Discontinued
RM-11	Biological Control of Thistles	Discontinued
RM-14	Elephant Seal Protection	Combined with PORE-N-40
RM-16	Control Feral Pigs	Discontinued
N-02	Backcountry Impact Study	Discontinued
N-06	Harbor Seal Study	Completed
N-07	Endangered Plant Study	Completed
PORE-N-09	Fire History and Fuel Loading	Completed
PORE-N-10	Inventory of Freshwater Fish	Completed
PORE-N-13	Assess Feral Hog Control	Discontinued
W-01	Water Quality Study	Combined with PORE-N-58
PORE-N-22	Reintroduce Bald Eagles	Discontinued
PORE-N-26	Protect Native Plant Habitat	Combined with PORE-N-55
PORE-N-33	Develop Water Resources Management Plan	Completed
PORE-N-35	Reintroduce Peregrine Falcons	Completed
PORE-N-40	Northern Elephant Seal Management Plan	Completed
PORE-N-43	Rehabilitate Backcountry Camps	Completed
PORE-N-44	Animal-proof Trash Receptacles	Completed
PORE-N-61	Cowbird Removal	Discontinued
PORE-N-74	Vision Fire-Rehabilitation and Monitoring	Completed
PORE-N-74.1	Vision Fire-GIS Analysis and Support	Completed
PORE-N-74.2	Vision Fire-Monitor Pt. Reyes Mt. Beaver	Completed
PORE-N-74.3	Vision Fire-Monitor Pt. Reyes Jumping Mouse	Completed
PORE-N-74.4	Vision Fire-Monitor Myrtle's Silverspot	Completed
PORE-N-74.5	Vision Fire-Sensitive Aquatic Species	Completed
PORE-N-74.6	Vision Fire-Monitor and Control Exotic Animals	Completed
PORE-N-74.7	Vision Fire-Monitor Water Quality Impacts	Completed

PORE-N-74.8	Vision Fire-Monitor Noxious Weeds	Completed
PORE-N-74.9	Vision Fire-Monitor T&E Plants	Completed
PORE-N-74.11	Vision Fire-Mapping	Completed
PORE-N-74.12	Vision Fire -Dozer Line Rehabilitation	Completed
PORE-N-74.13	Vision Fire -Replace Boundary Fence	Completed
PORE-N-74.14	Vision Fire -Trail Monitoring and Safety	Completed
PORE-N-97	Evaluate & Control Flooding at Park Headquarters	Completed
PORE-N-98	Air Quality Visibility Camera	Completed

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Appendix 3. Natural and Cultural Resource Consultations

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Appendix 4. Threatened, Rare and Endangered Plants of Point Reyes National Seashore

Genus and Species	Common Name	FED	STATE	CNPS
Abronia umbellata ssp. *breviflora*	pink sand-verbena	SOC	-	1B
Agrostis blasdalei	Blasdale's bent grass	SOC	-	1B
Agrostis clivicola var. *punta-reyesensis*	Point Reyes bent grass			
Alopecurus aequalis var. *sonomensis*	Sonoma alopecurus	E	-	1B
Arabis blepharophylla	Coast rock cress	-	-	4
Arctostaphylos virgata	Marin manzanita	-	-	1B
Blennosperma nanum var. *robustum*	Point Reyes blennosperma		SOC	R
Calamagrostis crassiglumis	Thurber's reed grass	SOC	-	2
Campanula californica	Swamp harebell	SOC	-	1B
Castilleja ambigua ssp. *humboldtiensis*	Humboldt Bay owl's clover			
Ceanothus gloriosus var. *gloriosus*	Point Reyes ceanothus	SOC	-	1B
Ceanothus gloriosus var. *porrectus*	Mount Vision ceanothus	SOC	-	1B
Chorizanthe cuspidata v. *cuspidata*	S.F. Bay spineflower	SOC	-	1B
Chorizanthe cuspidata v. villosa	woolly-headed spineflower		-	-
Chorizanthe valida	Sonoma spineflower	E	E	1B
Cirsium andrewsii	Franciscan thistle	-	-	4
Cordylanthus maritimus ssp. *palustris*	Point Reyes bird's beak			
Elymus californicus	California bottlebrush grass		-	-
Frittilaria affinis var. *tristulis*	Marin checker lily	-	-	1B
Fritillaria liliacea	fragrant fritillary	SOC	-	1B
Gilia capitata ssp. *chamissonis*	dune gilia	-	-	1B
Gilia millefoliata	dark-eyed gilia	-	-	1B

Grindelia hirsutula var. *maritima*	San Francisco hairy gumplant	SOC	-	
Hemizonia congesta ssp. *leucocephala*	hayfield tarplant	-		
Hesperevax sparsiflora var. *brevifolia*	short-leaved evax			
Horkelia cuneata ssp. *sericea*	Kellogg's horkelia	SOC	-	1B
Horkelia marinensis	Point Reyes horkelia	SOC	-	1B
Layia carnosa	Beach layia	E	E	1B
Lilium maritimum	coast lily	-	-	1B
Limnanthes douglasii ssp. *sulphurea*	Point Reyes meadowfoam	SOC	E	1B
Limosella subulata	Delta mudwort	-	-	2
Linanthus grandiflorus	large-flowered linanthus	-	-	4
Lupinus tidestromii	Tidestrom's lupine	E	E	1B
Monardella undulata	curly-leaved monardella	-	-	4
Perideridia gairdneri var. *gairdneri*	Gairdner's yampah	SOC	-	4
Phacelia insularis var. *continentis*	north coast phacelia	SOC	-	1B
Piperia elegans ssp. *decurtata*	Point Reyes rein orchid	-	-	1B
Plagiobothrys reticulatus v. *rossianorum*	San Francisco popcornflower			
Pleuropogon refractus	nodding semaphore grass	-	-	4
Polygonum marinense	Marin knotweed	SOC	-	3
Psilocarphus tenellus var. *globeriferus*	round wooly marbles			
Ranunculus lobbii	Lobb's aquatic buttercup	-	-	4
Sidalcea calycosa ssp. *rhizomata*	Point Reyes checkerbloom		-	-
Triphysaria floribundus	San Francisco owl's clover	SOC	-	

Notes:
CNPS = California Native Plant Society
Federal SOC = Federal Species of Concern (formerly Category 2 Candidate)
E = Endangered
R = Rare

Appendix 5. Threatened Rare and Endangered Fauna of Point Reyes National Seashore

Genus and Species	Common Name	Fed	State
Invertebrate			
Coelus globosus	Globose Dune Beetle	SC	
Lichnanthe ursina	Bumblebee Scarab Beetle	SC	
Ischnura gemina	San Francisco Forktail Damselfly	SC	
Nothochrysa californica	San Francisco Lacewing	SC	
Icaricia icariodes	Point Reyes blue butterfly	SC	
Incisalia mossii	Marin elfin butterfly	SC	
Speyeria zerene myrtleae	Myrtle's Silverspot	E	
Syncaris pacifica	California Freshwater Shrimp	E	E
Fish			
Lampetra tridentata	Pacific lamprey	SC	
Archoplites interruptus	Sacramento Perch	SC	
Eucyclogobius newberry	Tidewater Goby	E	
Gasterosteus aculeatus williamsoni	Unarmored Threespine Stickleback	E	E
Oncorhynchus kisutch	Coho salmon	T	
Oncorhynchus mykiss	Steelhead trout	T	
Amphibian/Reptile			
Ambystoma californiense	*California tiger salamander*	*C*	
Caretta caretta	Loggerhead sea turtle	T	
Dermochelys coriacea	Leatherback sea turtle	E	
Chelonia mydas	Green sea turtle	T	
Clemmys marmorata marmorata	Northwestern Pond Turtle	SC	C

Rana aurora draytoni	California Red-legged Frog	T	
Masticophis lateralis euryxanthus	Alameda Striped Racer	SC	T
Mammal			
Aplodontia rufa phaea	Point Reyes Mountain Beaver	SC	
Zapus trinotatus orarius	Point Reyes Jumping Mouse	SC	
Eumops perotis californicus	Greater western mastiff-bat	SC	
Plecotus townsendii townsendii	Pacific Western Big-eared Bat	SC	
Myotis evotis	Long-eared bat	SC	
Myotis thysanodes	Fringed myotis	SC	
Myotis volunas	Long-legged bat	SC	
Myotis yumanennsis	Yuma mytois	SC	
Arctocephalus townsendi	Guadeloupe Fur Seal	T	T
Eumetopias jubatus	Steller (Northern) Sea Lion	T	
Balaenoptera borealis	Sei Whale	E	
Balaenoptera musculus	Blue Whale	E	
Balaenoptera physalus	Finback Whale	E	
Enhydra lutris nereis	Southern Sea Otter	T	
Eschrichtius robustus	Gray Whale	E	(delisted)
Bird			
Agelaius tricolor	Tricolored Blackbird	SC	
Anser albifrons elgasi	Tule White-fronted Goose	SC	C
Brachyramphus marmoratus	Marbled Murrelet	T	
Branta canadensis	Aleutian Canada Goose	E	
Buteo regalis	Ferruginous Hawk	SC	
Buteo swainsoni	Swainson's Hawk	C	C

Charadrius alexandrinus nivosus	Western Snowy Plover	T	
Charadrius montanus	Mountain Plover	SC	
Diomedea albatrus	Short-tailed Albatross	E	
Falco peregrinus anatum	American Peregrine Falcon	E	E (delisted)
Geothlypis trichas sinuosa	Saltmarsh Common Yellowthroat	SC	
Grus canadensis tabida	Greater Sandhill Crane		T
Haliaeetus leucocephalus	Bald Eagle	E	E (delisted)
Histrionicus histrionicus	Harlequin duck	SC	
Laterallus jamaicensis coturniculus	California Black Rail	SC	T
Mycteria americana	Wood Stork	E	
Numenius americanus	Long-billed Curlew	SC	
Oceanodroma homochroa	Ashy storm-petrel	SC	
Pelecanus occidentalis	Brown Pelican	E	E
Rallus longirostris obsoletus	California Clapper Rail	E	E
Riparia riparia	Bank Swallow		T
Sterna antillarum	California Least Tern	E	E
Sterna elegans	Elegant Tern	SC	
Strix occidentalis	Northern Spotted Owl	T	

ADDENDA

Addendum 1. Subsidiary Plans and Documents:

Plan	Date Created/Revised
Range Management Guidelines.	1987, 1990
Fire Management Plan	1988,1990
Marine Mammal Supplement.	1980
Exotic Plant Management Plan.	1987
Tule Elk Management Plan	1998